TOMASHEVSKIY, V., mayor.

Work on methodology in academies. Voen.vest. 36 no.11: 33-35 N '56. (MLRA 10:2)

(Military education)

TOMASHEVSKIY, V., mayor.

Control of the training process in military academies. Voen.vest. 35 no.5:68-70 My '55. (MLRA 9:7)
(Military education)

TOMASHEVSKIY, V., podpolkovnik; KALINICHENKO, F., polkovnik

New tasks and obsolete methods. Voen.vest. 42 no.9:77-80 S '62. (MIRA 15:8)
(Russia—Army—Officers)

TOMASHEVSKIY, V., podpolkovnik

Generosity of soul. Voen. vest. 41 no.4:67-68 Ap '62.
(MIRA 15:4)
(Military education)

TOMASHEVSKIY, V.L.; KHMEL'NITSKAYA, A.Z., redaktor; GOTLIB, E.M., tekhnicheskiy redaktor.

[Technology of cardboard production] Tekhnologiia kartonazhnogo proizvodstva. Moskva, Pishchepromizdat, 1953. 170 p.
(Paperboard) (MIRA 7:12)

TOMASHEVSKIY, V.L.

Tekhnologiia kartonazhnogo pro-
izvodstva (Technology of cardboard production).
Moskva, Pishchepromizdat, 1953. 172 p.

SO: Monthly List of Russian Accessions, Vol. 7, No. 5, August 1954

TOMASHEVSKIY, V L

Tekhnologiya Kartonazhnogo Proizvodstva (Technology of Cardboard Production) Moskva, Pishcheprom izdat, 1953.

So: N/5
718.5
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TOMASHEVSKIY, V.T. (Leningrad)

Structural glass-reinforced plastics based on polyester and epoxide resins. Inzh.zhur. 2 no.2:389-397 '62. (MIRA 15:6)
(Glass reinforced plastics)

L 29811-66 EWT(d)/EWT(m)/EWP(w)/EWP(v)/EWP(k) IJP(c) WW/EM

ACC NR: AP6014213 SOURCE CODE: UR/0198/66/002/004/0007/0016

AUTHOR: Tomashevskiy, V. T. (Leningrad)

ORG: none

TITLE: Effect of shear and the stress condition on the stability of an anisotropic cylinder

SOURCE: Prikladnaya mekhanika, v. 2, no. 4, 1966, 7-16

TOPIC TAGS: stress analysis, stability ~~criterion~~ structure, shear stress, elasticity theory, partial differential equation, variational method, cylindric shell structure

ABSTRACT: The stability of an orthotropic circular cylinder is considered. The cylinder is made of a material that obeys Hooke's law and is pliable to shear displacement. The governing equations and the boundary conditions are obtained from the variational method, starting from the potential energy of deformation for the cylinder. In the derivation of these equations the variables u, v, w, φ, ψ are assumed to be linearly independent functions of the coordinates α and β. For a closed cylinder, the boundary conditions are given by the equations

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L 29811-66

ACC NR: AP6014213

$$\frac{\partial \Phi^*}{\partial (u_i)_{\alpha\alpha}} \delta (u_i)_\alpha = 0;$$

$$\left[\frac{\partial \Phi^*}{\partial (u_i)_\alpha} - \frac{\partial}{\partial \alpha}\frac{\partial \Phi^*}{\partial (u_i)_{\alpha\alpha}} - \frac{\partial}{\partial \beta}\frac{\partial \Phi^*}{\partial (u_i)_{\alpha\beta}}\right] \delta u_i = 0.$$

As an illustration, the cylinder is assumed to be freely supported at its sides by elastic circular ribs. Numerical results are obtained and are given in tabular form where the critical pressure is listed with and without shear. It is shown that if the effects of the support or the shear effects on the stress distribution of the cylinder are neglected, inadmissible errors arise in the stability calculations of the anisotropic shell. Orig. art. has: 20 equations and 3 tables.

SUB CODE: 20/ SUBM DATE: 30Jul65/ ORIG REF: 004

Card 2/2

L 20410-66 EWI(d)/EWT(m)/EWP(w)/EWP(v)/EWP(j)/T/EWP(k)/EWA(h)/ETC(m)-6 IJP(c)
ACC NR: AP6008406 WW/EM/RM(A) SOURCE CODE: UR/0374/66/000/001/0108/0115

AUTHOR: Tomashevskiy, V. T. (Leningrad)

ORG: none

TITLE: Axisymmetric deformation of a thick circular cylinder of fiber glass reinforced plastic reinforced with rigidity ribs

SOURCE: Mekhanika polimerov, no. 1, 1966, 108-115

TOPIC TAGS: fiberglass, reinforced plastic, plastic deformation, deformation rate, shell theory, reinforced shell structure

ABSTRACT: A system of differential balance equations for a thick fiber glass reinforced plastic cylinder reinforced by rigidity ribs is given. A solution is given for the system in consideration of the compatibility of deformation for the shell and the ribs under limit conditions. The limits of application of the thin shell theory are determined, and suggestions on the choice of optimal reinforcement systems are presented. Orig. art. has: 19 formulas and 3 tables. [Based on author's abstract.] [NT]

SUB CODE: 11/ SUBM DATE: 17Jul65/ ORIG REF: 002/

Card 1/1 BK UDC: 678:639.37-43:678.506

TOMASHEVSKIY, V.T., kand. tekhn. nauk, inzhener-kapitan 3-go ranga

Synthetic construction materials in submarine building. Mor. sbor. 48 no.7:69-72 Jl '65. (MIRA 18:8)

ACC NR: AP7006926 SOURCE CODE: UR/0198/67/003/001/0034/0041

AUTHOR: Tomashevskiy, V.T. (Leningrad)

ORG: none

TITLE: On a method of investigating the stability of anisotropic circular cylinders under arbitrary boundary conditions

SOURCE: Prikladnaya mekhanika, v. 3, no. 1, 1967, 34-41

TOPIC TAGS: cylindric shell, STRUCTURE shell stability, shell buckling, ~~hoop stress, elastic clamping, elastic clamping factor~~ ANISOTROPIC MEDIUM

ABSTRACT: A thin orthotropic circular cylindrical shell with faces supported by elastic rings is subjected to a combination of longitudinal uniformly distributed and lateral loads. The materials of both shell and supporting rings obey Hooke's law. An approximate method of investigating the stability of this shell under arbitrary boundary (support) conditions is proposed. The integral-mean value of the hoop stresses is introduced into the system of differential equations describing the prebuckling state of stress in the shell. The Bubnov-Galerkin method is used in deriving a system of equations from which the critical values of hoop stresses can be determined by equating the determinant of this system to zero. The possibility of approximating

Card 1/2 UDC: none

ACC NR: AP7006926

(with satisfactory engineering accuracy) the mode of the shell buckling is indicated. The buckling of a closed cylindrical shell elastically clamped along its face edges is investigated as an example, introducing an elastic coefficient κ which reduces the edge-clamping moment. An expression for determining the critical values of hoop stresses in cases of edges simply supported ($\kappa = 0$) and perfectly fixed ($\kappa = 1.0$) is derived. A formula is also derived for determining κ for a given shell by successive approximations. Some results of a numerical calculation are given and are discussed, pointing out the effects of rigidity of rings and of the shell, of anisotropy of elastic characteristics of their materials, and of boundary (support) conditions on the buckling behavior of the shell. Orig. art. has: 2 tables and 19 formulas. [WA-52] [VK]

SUB CODE: 20/ SUBM DATE: 09Sep65/ ORIG REF: 006/

Card 2/2

TOMASHEVSKIY, Ya.I.

Therapeutic value of vitamin B_1 and nicotinic acid in motor disorders of the stomach. Vrach.delo no.4:433-434 Ap '60. (MIRA 13:6)

1. Kafedra propedevticheskoy terapii (zav. - dotsent V.I. Chernov) lechebnogo fakul'teta L'vovskogo meditsinskogo instituta.

(THIAMINE) (NICOTINIC ACID) (STOMACH--DISEASES)

TOMASHEVSKIY, Ya.I.

Influence of vitamin B_1 on the secretory and evacuatory motor function of the stomach. Vrach.delo no.5:537-539 My '59.
(MIRA 12:12)

1. Kafedra propedevticheskoy terapii (zav. - dotsent V.I. Chernov) lechebnogo fakul'teta L'vovskogo meditsinskogo instituta.
(THIAMINE) (STOMACH--DISEASES)

TOMASHEVSKIY, Ya.I.

Role of nicotinic acid in the regulation of the secretory and the evacuatory-motor function of the stomach. Vrach.delo no.9:985 S '59. (MIRA 13:2)

1. Kafedra propedevticheskoy terapii (zaveduyushchiy - dotsent V.I. Chernov) lechebnogo fakul'teta L'vovskogo meditsinskogo instituta.
(NICOTINIC ACID)

CHERNOV, V.I., dotsent; TOMASHEVSKIY, Ya.I.

Gastric secretory function in the treatment of peptic ulcer and chronic gastritis with Vitamin B_1 and nicotinic acid. Vrach. delo no.8:138-139 Ag '61. (MIRA 15:3)

1. Kafedra propedevticheskoy terapii (zav. - dotsent V.I. Chernov) lechebnogo fakul'teta L'vovskogo meditsinskogo instituta.
(STOMACH--DISEASES)
(THIAMINE) (NICOTINIC ACID)

TOMASHEVSKIY, Yuriy Ivanovich; KOLVOLOV, Yuriy Aleksandrovich; DEGTYAREV, Lev Mikhaylovich; [illegible], Ye.S., red.

[Mechanized casting of grinding media in chills] Mekhanizirovannaia otlivka moliushchikh tel v kokil'. Cheliabinsk, Cheliabinskoe knizhnoe izd-vo, 19[illegible]. 29 p. (MIRA 17:9)

18(5), 28(1) SOV/128-59-10-10/24

AUTHORS: Pozdnyshev, V.M., Candidate of Technical Sciences, Sal'nikov, V.V., Krivopalov, Yu.I., Tomashevskiy, Yu.I., and Shabonov, N.S., Engineers

TITLE: Conveyer Mould Machine for the Casting of Mill Balls

PERIODICAL: Liteynoye proizvodstvo, 1959, Nr 10, pp 30-31 (USSR)

ABSTRACT: The authors present a technology for mass production of mill balls, which has been developed by the Nauchno-issledovatel'skiy institut tekhnologii mashinostroyeniya Chelyabinskogo sovnarkhoza (Scientific Research Institute for Technology of Machine Building of the Chelyabinsk Sovnarkhoz), together with the Katav-Ivanovyy liteyno-mekhanicheskiy zavod (Katav-Ivanovo Foundry Mechanical Factory). This technology is based on a conveyer mould machine with vetical plane and with continuous Priming (Fig.1). The basic part of the machine is a vertical closed chain (#1), on which the moulds are fastened and transported by special rolls (#2). The moulds have a traveling part (#3) and a fixed part (#3a). The chain moves in two gears on the frame (#4). The metal is poured with the pouring plat-

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Conveyer Mould Machine for the Casting of Mill Balls

form (#5) onto that section of the chain which has the maximum tension (#6). At the present time, complete mechanization of mill ball production is being worked on. There are 2 photographs.

POLAND/Cultivated Plants. Grains.

M

Abs Jour: Ref Zhur-Biol., No 5, 1958, 20283.

Author : Z. Tomashevskiy, A. Brodovskaya.
Inst : The Institute of Plant Cultivation and Acclimatization.
Title : A Plan of Scientific Studies of Corn. (Plan nauchnykh rabot po kukuruze).

Orig Pub: Biul. Inst. hodowli i aklimat. roslin, 1956, No 11, 91-103.

Abstract: No abstract.

Card : 1/1

TOMASHIN, I.

More attention to the needs of workers on virgin lands. Sov. profsoiuzy 6 no.8:34-35 Jl '58. (MIRA 11:9)

1.Glavnyy agronom sovkhoza "Novo-Nikol'skiy" Akmolinskoy oblasti, Kazakhskoy SSR.
(Akmolinsk Province--Agricultural laborers)

TOMASHIVSKIY, D.I.

Relationship of plantar and palmar reflexes in epidermophytosis. Vest. derm. i ven. no.2:26-32 '65. (MIRA 18:10)

1. Kafedra kozhnykh i venericheskikh bolezney (zav. - prof. A.R. Shifrin) Ivano-Frankovskogo meditsinskogo instituta (nauchnyye rukovoditeli rabot - chlen-korrespondent AMN SSSR prof. P.V. Kozhevnikov i prof. A.R.Shifrin).

SHIFRIN, A.R., doktor med. nauk; TOMASHIVSKIY, D.I.

Secondary eruptions associated with antitularemia vaccination.
Sov. med. 26 no.11:56-59 N'62 (MIRA 17:3)

1. Iz kafedry kozhnykh i venericheskikh bolezney (zav. - doktor meditsinskikh nauk A.R. Shifrin) Stanislavskogo meditsinskogo instituta (rektor - dotsent G.A. Babenko).

TOMASHIVSKIY, D.I.

Problem of the etiology, clinical aspects, and treatment of plantar verruca. Vest. derm. i ven. 34 no. 5:65-67 '60. (MIRA 14:1)
(FOOT--TUMORS)

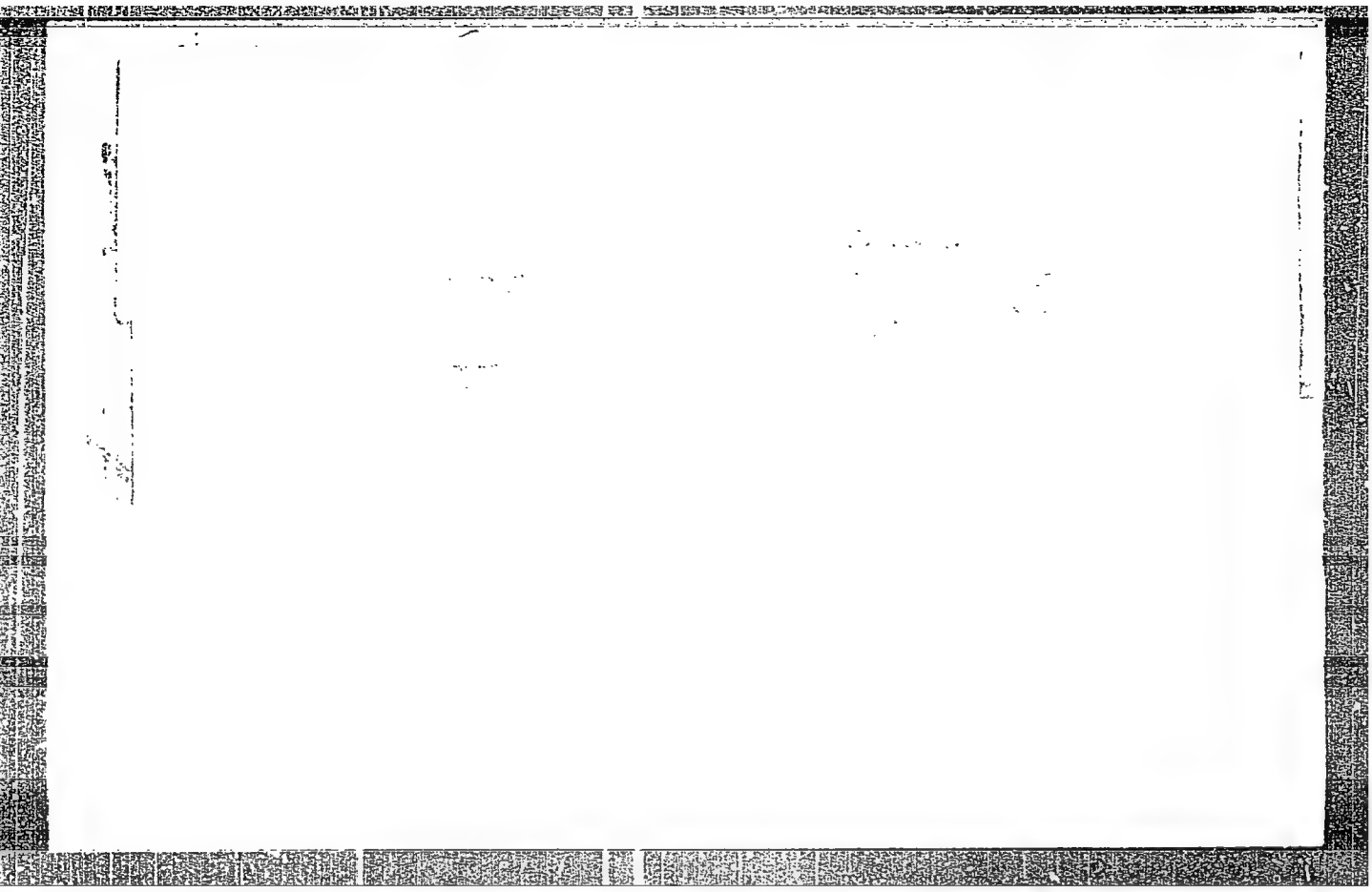
TOMASHKOVA, Yana [Tomaskova, Jana], doktor; PAVLASKOVA, Lidiya [translator]; BRZHIZOVA, Ioza [Brizova, Joza], otv. red.

[Health and beauty care] Zabota o zdorov'e i krasote. Prague, Izd-vo "Pratse," 1961. 118 p. (MIRA 15:4)
(BEAUTY CULTURE) (WOMEN--HEALTH AND HYGIENE)

TOMASHOV, A. D.

TSYPKIN, B.V., inzhener; AL'SHITS, I.Ya., kandidat tekhnicheskikh nauk;
TOMASHOV, A.D., inzhener; REVIN, I.A., inzhener, retsenzent;
GOLOVIN, Ye.S., kandidat tekhnicheskikh nauk, redaktor.

[Bearing units for rolling machinery] Podshipnikovye uzly prokatnogo oborudovaniia. Moskva, Gos. nauchno-tekhn. izd-vo mashinostroit. i sudostroit. lit-ry, 1954. 290 p. (MLRA 7:7)
Rolling-mill machinery) (Bearings (Machinery))



APPROVED FOR RELEASE: 04/03/2001 CIA-RDP86-00513R001756210006-3"

L 28535-66 EWI(m)/EWP(t)/ETI IJP(c) JH/JD/WB/GD

ACC NR: AT6013797 (N) SOURCE CODE: UR/0000/65/000/000/0180/0190

62
B+1

AUTHOR: Tomashov, N. D.; Zalivalov, F. P.

ORG: none

TITLE: Formation and growth of anodic oxide films[16] on aluminum[27] alloys

SOURCE: Korroziya metallov i splavov (Corrosion of metals and alloys), no. 2. Moscow, Izd-vo Metallurgiya, 1965, 180-190 [14]

TOPIC TAGS: anodization, aluminum base alloy, intermetallic compound, electric potential, corrosion

ABSTRACT: Considering that the anodizing of alloys with a substantial content of alloy components involves special difficulties and, on the other hand, the anodic oxidation of homogeneously structured Al alloys has been fairly well investigated, this study deals with the anodic oxidation of heterogeneous Al alloys. To this end; the authors melted special binary alloys (15% Mn, 35% Si, 12% Fe, 46% Cu, 45% Mg, 55% Zn) in which the intermetallic compounds represented large crystals with surface area of from 1 to 2-3 mm^2. Voltage-time curves were plotted for the overall surface of the alloy as well as for the individual components of the alloy -- the eutectic and crystal. In addition, the alloy potential before and after anodic oxidation was measured with respect to a Hg_2SO_4 reference electrode. The anodizing was performed in 4N H_2SO_4 at 25°C (current density 1 a/dm^2, anodizing time 5 sec and 20 min). It is

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ACC NR: AT6013797

found that, in the process of anodizing, such alloy components as crystals of Si and $MnAl_6$ get covered with a thin oxide film and pass into anodic film. As for $FeAl_3$ and $CuAl_3$ crystals, during anodizing they may either completely dissolve or pass into anodic film depending on the location of crystals in the alloy and their size; smaller crystals, as well as crystals present at the alloy surface are most prone to dissolve, while larger crystals not present directly at the alloy surface at the onset of anodizing pass into the anodic film. By contrast, the anodizing of Al-Mg and Al-Zn alloys leads to an intensive dissolution of their intermetallic components as evidenced by the fact that the potential of the Al-Mg and Al-Zn alloys returns to its original value immediately after the anodic current is disconnected. Thus, every individual Al alloy displays special features of its own depending on the nature of its structural components; on this basis, three groups of Al alloys may be distinguished as regards the effect of anodic oxidation: the first group includes alloys with Mn and Si, for which the voltage increases sharply and the structural components ($MnAl_6$ and Si crystals) get covered with a thin dense oxide film; the second group includes alloys with Fe and Cu, whose intermetallic compounds are insufficiently protected against corrosion even when covered by an oxide film; and the third group includes alloys with Mg and Zn, which completely lack a protective oxide film and so are highly corrosion-prone. Orig. art. has: 6 figures and 1 table.

SUB CODE: 11, 07, 20/ SUBM DATE: 19Jul65/ ORIG REF: 004/

Card 2/2

L 28533-66 EWT(m)/EWA(d)/EWP(t)/ETI IJP(c) JH/JD/WB/GD

ACC NR: AT6013799 (N) SOURCE CODE: UR/0000/65/000/000/0200/0207

AUTHOR: Tomashov, N. D.; Zalivalov, F. P.

ORG: none

TITLE: Investigation of the barrier layer of thick anodic films on aluminum

SOURCE: Korroziya metallov i splavov (Corrosion of metals and alloys), no. 2 Moscow, Izd-vo Metallurgiya, 1965, 200-207

TOPIC TAGS: loop oscillograph, anodization, aluminum, oxide formation, corrosion, dielectric breakdown, surface film/MPP-2 loop oscillograph, AV000 extra-pure Al

ABSTRACT: Considering the widespread use of the method of thick-film anodizing and the definite effect of the barrier layer on such properties of porous anodic films as corrosion resistance and resistance to dielectric breakdown, the authors investigate the thickness of the barrier layer as a function of applied voltage, temperature, electrolyte concentration and anodizing time. The tests were performed on specimens (20x20x2 mm) of AV000 extra-pure cast aluminum (99.99% Al), anodically oxidized in sulfatic electrolyte. The thickness of the barrier layer was determined by the technique suggested by Hunter and Fowle (J. Electrochem. Soc., 1954, 101, 9, 481; 10, 514). Findings: the thickness of the barrier layer increases linearly with the

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L 28533-66

ACC NR: AT6013799 O

voltage applied (at the rate of somewhat more than 10 Å/v and decreases with increasing electrolyte temperature (owing to the attendant increase in the dissolving power of the electrolyte); it also decreases with increasing H_2SO_4 concentration (from 2N to 8N), though not as steeply as with increasing temperature. As for the effect of anodizing time on barrier-layer thickness, this thickness changes only during the first few seconds, when the curve passes through a peak, whereupon it remains constant even for films whose anodizing time lasts for 15 min and longer. Curves plotted with the aid of an MPP-2 loop oscillograph show that the increase in barrier-layer thickness is accompanied by an increase in terminal voltage, as confirmed by measurements of ohmic resistance, which increases from 10 to 18 ohm-cm when the layer thickness increases from 50 to 300 Å; as in the case of the effect of anodizing time, however, this increase soon passes through its peak and steadies out owing to the onset of the formation of the porous structure -- since the increase in current intensity enhances the aggressive effect of the acid (the ohmic resistance of the oxide film decreases in the pores). Hence, the following theory may be offered: the first pores in the oxide film arise at some defective spots, e.g. cracks or at the crystallite boundaries. The growth of the pore at the outer part of the barrier film is accompanied, at the film-metal interface, by the growth of a new layer of oxide whose individual cells are shaped like a semisphere whose convex side faces the metal. During the first few seconds of anodizing, when the peak thickness

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L 28533-66

ACC NR: AT6013799 O

of the barrier layer is reached, the entire surface of the barrier layer gets covered by the pores, with the attendant growth of oxide cells representing the "building blocks" of porous anodic films. In the course of film growth the electrolyte reaches the barrier layer via the pores, thus leading to the formation of new layers of oxide. Thus, it may be assumed that the porous layer of the anodic oxide film, whatever its thickness, grows above the barrier film and from the barrier film. Orig. art. has: 7 figures, 1 table

SUB CODE: 11,07/ 11/ SUBM DATE: 19Jul65/ ORIG REF: 013/ OTH REF: 003

Card 3/3

L 28404-66 EWT(m)/EWP(t)/ETI IJP(c) JD/WB/GD

ACC NR: AT6013785 (N) SOURCE CODE: UR/0000/65/000/000/0080/0102

AUTHOR: Tomashov, N. D. (Doctor of chemical sciences, Professor); Modestova, V. N.; Plavich, L. A.; Averbukh, A. B.

ORG: none

70
68
13+1

TITLE: Study of the electrochemical behavior of titanium 21

SOURCE: Korroziya metallov i splavov (Corrosion of metals and alloys), no. 2 Moscow, Izd-vo Metallurgiya, 1965, 80-102

TOPIC TAGS: electrochemistry, corrosion, titanium, electric potential, anodization, sulfuric acid, titanium oxide

ABSTRACT: Ti is an electronegative metal. The standard electrode potential of its dissolution in the form of divalent ions Ti^{2+} is -1.63 v, and in the form of trivalent ions Ti^{3+}, -1.21 v. Nevertheless, the intense corrosion of Ti, as well as its anodic dissolution in solutions of non-oxidizing acids, occurs in the presence of potentials that are approx. 1 v more positive than the above values, i.e. at -0.45 and -0.25 v. This indicates that the dissolution of Ti during corrosion and anodic depolarization occurs with an exceptionally high anodic inhibition. In studies of the electrochemical behavior of Ti allowance must be made for the thermodynamic

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possibility of the existence of both the hydride and the oxides of Ti at the surface of Ti over a broad range of potentials, the more so as it is known that not only the oxides but also the hydride of Ti usually inhibit the corrosion rate of Ti in acids. It has also been observed that prior cathodic polarization inhibits in certain cases the anodic dissolution of Ti. In this connection the authors investigate the effect of the hydride layer, forming on Ti during its corrosion or cathodic polarization, on the electrochemical dissolution and oxidation of Ti. To this end, the anodic potentiostatic curves were plotted for Ti with various duration of prior cathodic polarization of its surface. On comparing curves 1 and 2 in Fig. 1 it can be seen that the hydride layer produced during 1 hr of cathodic polarization sharply inhibits the process of the anodic dissolution of Ti: the limiting passivation current is reduced nearly in half. If this prior cathodic polarization is prolonged for 18 hr, however, an opposite effect is produced: the maximum anodic current increases (curve 3). This is due to the loosening and augmentation of true surface area of Ti owing to the absorption of hydrogen. In the region of active anodic dissolution the surfaces of Ti (whether pure or with hydride layer) get oxidized. The degree of this oxidation increases as the potential changes from its normal value to a positive (anodic) value. Studies of the corrosion resistance of Ti oxides show that the oxides forming in the presence of a potential of +1.0 v in a 3N H_2SO_4 solution, and particularly in diluted 0.5N or 0.1N H_2SO_4 solutions, are relatively resistant in the region of active anodic dissolution and in conditions of cathodic polarization. In

L 28404-66

ACC NR: AT6013789

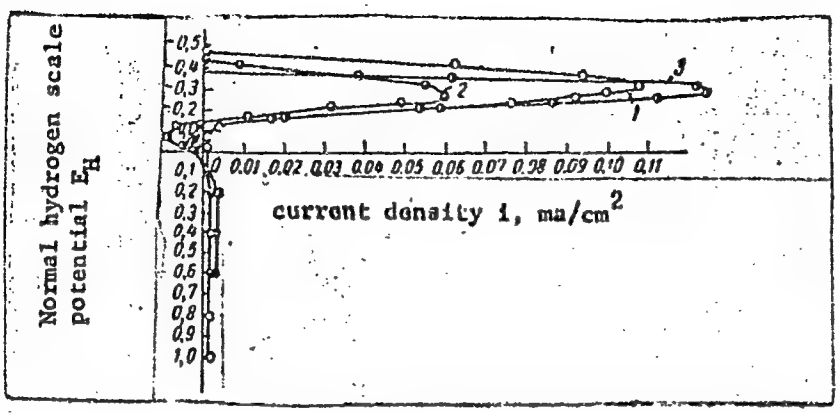

Fig. 1. Anodic potentiostatic curves plotted for Ti in 3% H_2SO_4 solution:

1 - titanium with a hydride layer produced after 1 hr of cathodic polarization at $i = 50$ ma/cm^2 and $\delta \approx 2$ μ; 3 - titanium after 18 hr of cathodic polarization at $i = 5$ ma/cm^2, $\delta \sim 10$ μ

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L 28404-66
ACC NR: AT6013789

the process of the anodizing of Ti the oxides form on the hydride layer of Ti. The thickness of the hydride layer then is hardly affected. In the course of anodic oxidation, diffusion of Ti ions takes place from the metal across the hydride layer. The relative corrosion resistance of Ti in the solutions of acids in which corrosion occurs with hydrogen depolarization is due to hydride-oxide passivity. Orig. art. has: 11 figures, 1 table

SUB CODE: 07, 11 SUBM DATE: 19Jul65/ ORIG REF: 013 OTH REF: 008

Card 4/4 LC

L 28532-66 EWP(j)/EWP(k)/EWT(m)/T/EWP(e)/EWP(t)/ETI IJP(c) RM/WW/JD/HW/WB/GD

ACC NR: AT6013800 (A) SOURCE CODE: UR/0000/65/000/000/0208/0219

66
B+1

AUTHOR: Tomashov, N. D.; Leonov, V. V.

ORG: none

TITLE: Effect of zinc filler on the protective properties of bituminous coatings

SOURCE: Korroziya metallov i splavov (Corrosion of metals and alloys), no. 2 Moscow, Izd-vo Metallurgiya, 1965, 208-219

TOPIC TAGS: bituminous coating, filler, zinc, metal coating, electrode, steel structure / St. 3 steel

ABSTRACT: Recently paint and varnish coatings with metal-powder (chiefly Zn and Al) fillers have begun to be widely used to protect steel structures against corrosion. In this connection, the article deals with elucidating the protective effect of zinc filler on bituminous coatings. The film-forming agent used was a primer (solution of bitumen in gasoline, in the ratio 1:3, used here to obtain uniform and thin bituminous coatings), and the filler was zinc dust (particle size 1 μ). Films with different concentrations of Zn filler (0 to 30% vol.%, which corresponded to 0 to 80 wt.% of the film) were investigated. Iron wire electrodes (of St. 3 steel) were used as the specimens. The thickness of thin films was determined by measuring electrode capacitance, and of thick films, with the aid of a micrometer. The

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L 28532-66

ACC NR: AT6013800

0

quantities measured were: the change in potentials, capacitance and ohmic resistance and corrosion rate of the electrodes when coated with films 0.5 to 500 μ thick and immersed in a 0.5N solution of NaCl. The observed pattern of variation in these quantities indicates that for thick (>10-20 μ) coatings the corrosion rate of the electrodes remains negligibly small. This points to high protective properties of the coating itself as well as of the layer of the dissolution products of Zn forming at the coating's surface. Experiments with pairs consisting of a non-coated electrode and a coated electrode showed that for some time, which is a function of the thickness of coating and its Zn concentration, the coated electrode works as an effective anode with respect to the corrosion medium. A study of the behavior of these coatings in clay and sand with 10% moisture content shows that even thin Zn-filler coatings protect iron in soil for a much longer period of time than in liquid electrolytes; this finding points to the great usefulness of Zn-filled bituminous coatings for subsurface structures -- greater than for surface structures or for liquid corrosion media. The mechanism of action of the Zn filler is not confined to the protective electrochemical effect of Zn particles with respect to the protected metal but is also based on the eventual densification of the surface layer of the coating by the relatively insoluble products of the corrosion of Zn. Orig. art. has: 10 figures

SUB CODE: 13, 07, 11, 20/ SUBM DATE: 19Jul65/ ORIG REF: 005/ OTH REF: 002

Card 2/2 NV

ACC NR: AT7004169 SOURCE CODE: UR/0000/66/000/000/0166/0177

AUTHOR: Tomashov, N.D.; Matveyeva, T.V.

ORG: none

TITLE: Corrosion and electrochemical behavior of rhenium

SOURCE: AN SSSR. Institut fizicheskoy khimii. Korroziya i zashchita konstruktsionnykh splavov (Corrosion and protection of structural alloys) Moscow, Izd-vo Nauka, 1966, 166-177

TOPIC TAGS: rhenium, ~~rhenium~~ corrosion, ~~Rhenium~~ electrochemical analysis ~~passivation, passivation potential~~

ABSTRACT: Specimens of rhenium, sintered from 99.999%-pure electrolytic rhenium powder, were forged with intermediate annealing in vacuum at 2000C and tested for electrochemical and corrosion behavior in H_2SO_4, H_3PO_4, KOH, HNO_3 and NaCl solutions of various concentrations at temperatures ranging from 25 to 100C and for time periods up to 200 days. Corrosion tests were made on specimens fully submerged into solutions under conditions of natural aeration. In fully nonoxidizing media, e.g., distilled oxygen-free water, rhenium at 100C had a very low corrosion rate (0.001 g/m^{2}hr). In nonoxidizing acids (sulfuric, hydrochloric, phosphoric) of any concentration in the presence of air oxygen, the corrosion rate was less than 0.001 g/m^{2}hr at 25C and slightly higher,

Card 1/2 UDC: none

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max. 0.016 g/m^{2}hr, at 100C. Rhenium had a similar low corrosion rate, less than 0.001 g/m^{2}hr, in distilled water with access to air oxygen at 25C; but at 100C, the corrosion rate was 0.05 g/m^{2}hr, the same as that in 0.8 and 16% NaCl solutions at 100C. Alkalies were found to be more reactive with rhenium than nonoxidizing acids; even at 25C the rhenium dissolution rate in 3 and 10% KOH solutions was 0.015 g/m^{2}hr. In oxidizing media (hydrogen peroxide solutions at a concentration higher than 0.05%; nitric-acid solutions at a concentration higher than 10%) rhenium corroded readily; its corrosion rate in 40% nitric acid was about 200 g/m^{2}hr and remained practically constant with further increases in the acid concentration. In the investigated solutions, rhenium corrosion has an electrochemical nature, and the corrosion behavior is determined entirely by the kinetics of the anodic and cathodic processes under the investigated conditions. Oxidizing solutions which ensure the effective course of cathodic depolarization shift the stationary potential of rhenium into the positive region (up to +1.0 v), which results in a high corrosion rate because of the overpassivation phenomenon. The passivation properties of rhenium are very weak. In nonoxidizing acids at the near-stationary potentials (up to +0.85 v) rhenium is passive (the anodic current is less than 0.001 mamp/cm^2). In the same region of potentials (from 40.4 to +0.8 v), rhenium is passive to some extent also in NaCl and KOH solutions but at relatively high current densities (about 1.0 mamp/cm^2). Orig. art. has: 7 figures and 1 table. [MS]

SUB CODE: 11/ SUBM DATE: 27Sep66/ ORIG REF: 003/ OTH REF: 004/
ATD PRESS: 5116
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ACC NR: AP7002390 SOURCE CODE: UR/0020/66/171/005/1134/1137

AUTHOR: Tomashov, N. D.; Strukov, N. M.; Vershinina, L. P.

ORG: Institute of Physical Chemistry, Academy of Sciences, SSSR (Institut fizicheskoy khimii Akademii nauk SSSR)

TITLE: Effect of continuous renewal of the surface of certain metals on the cathodic process of hydrogen evolution

SOURCE: AN SSSR. Doklady, v. 171, no. 5, 1966, 1134-1137

TOPIC TAGS: cathode polarization, hydrogen, metal surface, lead, tin, iron, nickel, palladium

ABSTRACT: Cathodic polarization curves were recorded for Pb, Sn, Fe, Ni and Pd in 1 N H_2SO_4 under argon at 20°C while the surface of the metal was being continuously renewed by means of an emery wheel. The electrode was cathodically polarized by an external current source. The data indicate that on nickel, the discharge of H^+ ions with the formation of adsorbed atoms and their removal from the electrode surface take place at comparable rates, so that during continuous renewal of the surface the effect of hydrogen overvoltage drop on this metal is appreciable. On lead, however, the hydrogen overvoltage is determined solely by the slowness of the step of discharge of H^+ ions, and therefore the continuous renewal of the surface does not substantially affect the hydrogen overvoltage on lead. From the standpoint of their behavior during

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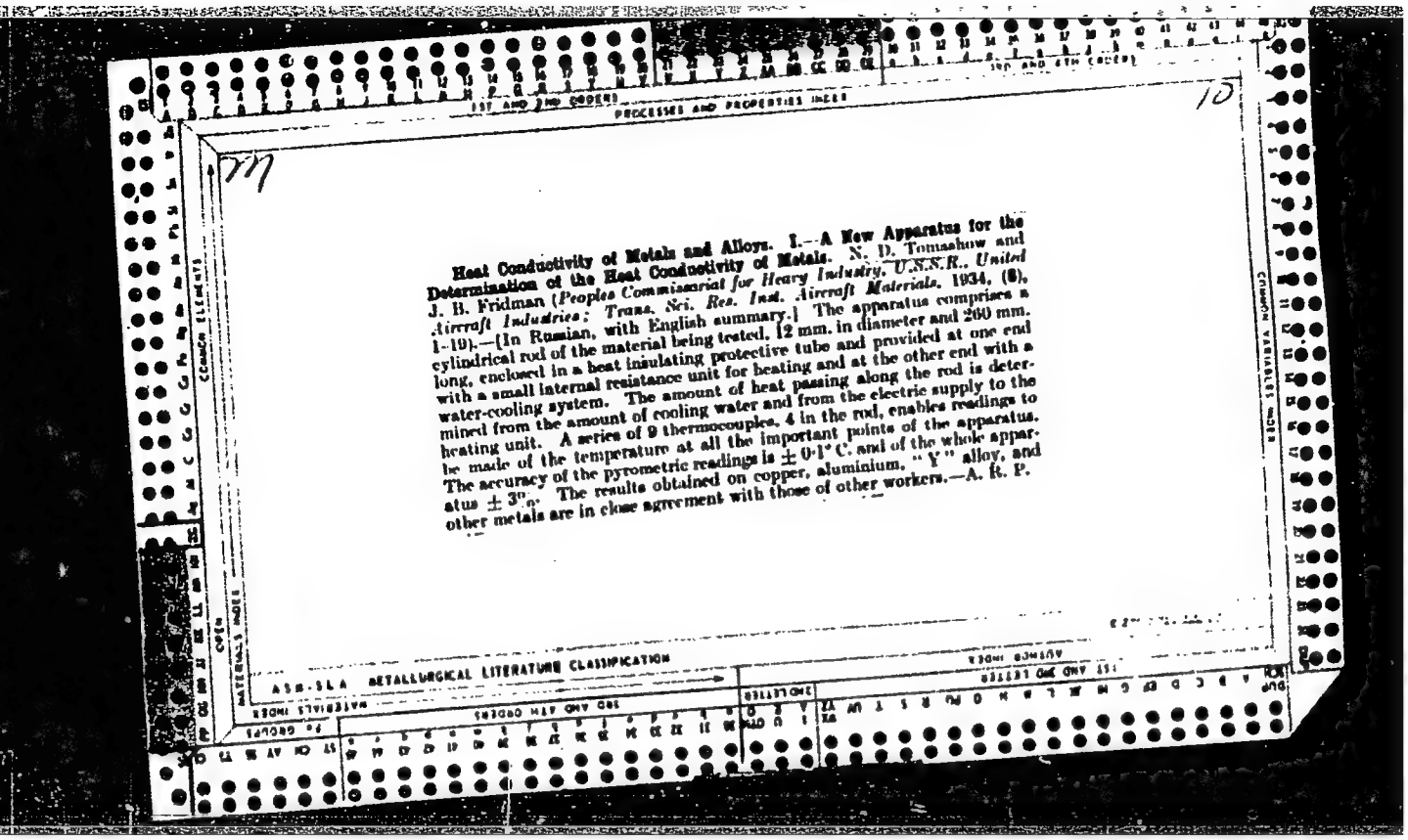
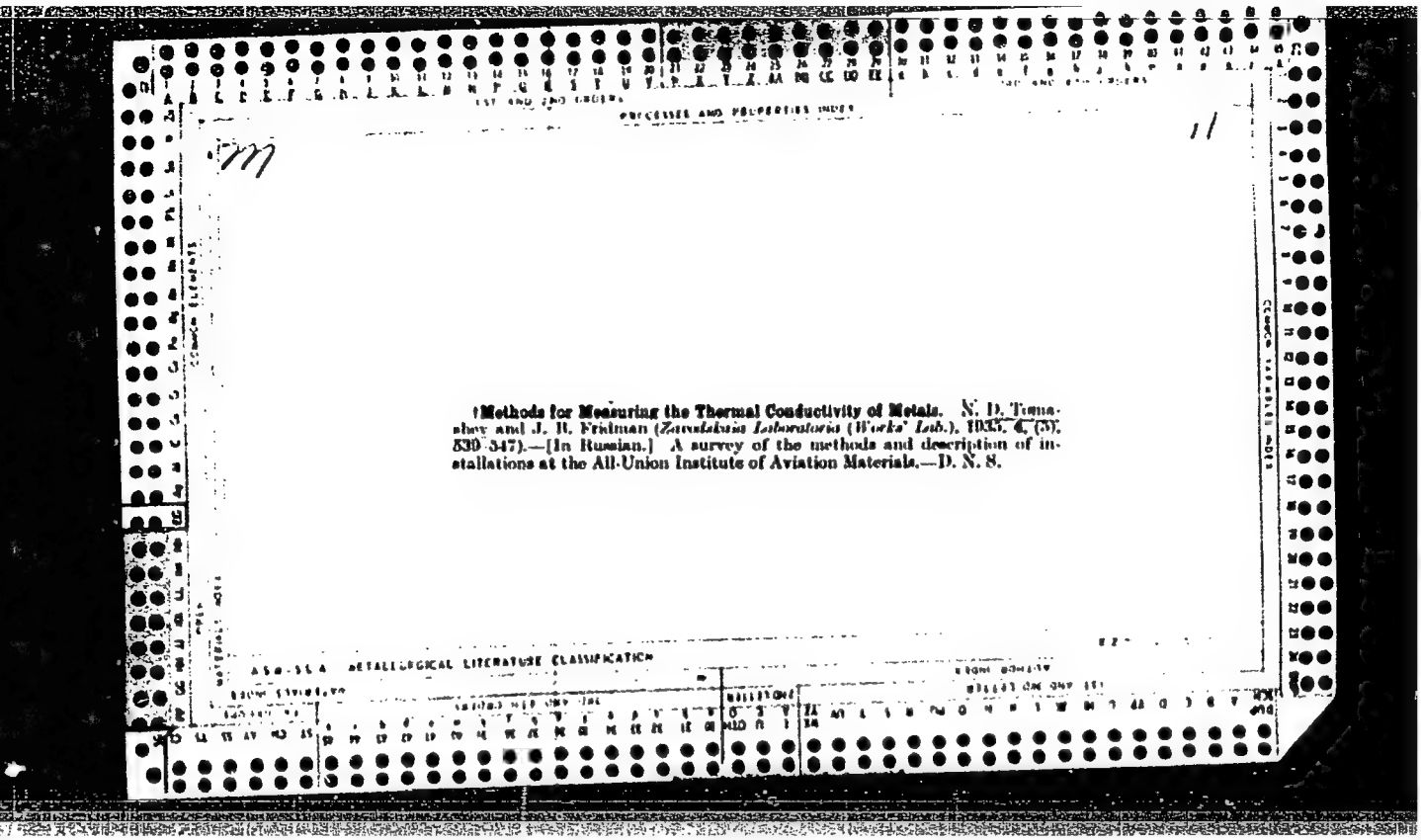
cleaning, the metals studied are divided into two groups: those which adsorb hydrogen well (Fe, Ni, Pd), and those which adsorb it poorly (Pb, Sn). In the latter group, hydrogen overvoltage is solely determined by the slow discharge step. In the former group, hydrogen overvoltage is determined not only by this step, but also by the slowness of the steps involving removal of hydrogen from the metal surface. Thus, for palladium it was found that at the current density employed, 10 mA/cm^2, 2/3 of the total overvoltage is determined by the slowness of the steps involving removal of hydrogen from the Pd surface, and only 1/3 by the slow discharge step. The paper was presented by Academician Spitsyn, V. I., 22 Mar 66. Orig. art. has: 3 figures and 2 tables.

SUB CODE: 07/ SUBM DATE: 17Feb66/ ORIG REF: 006/ OTH REF: 004

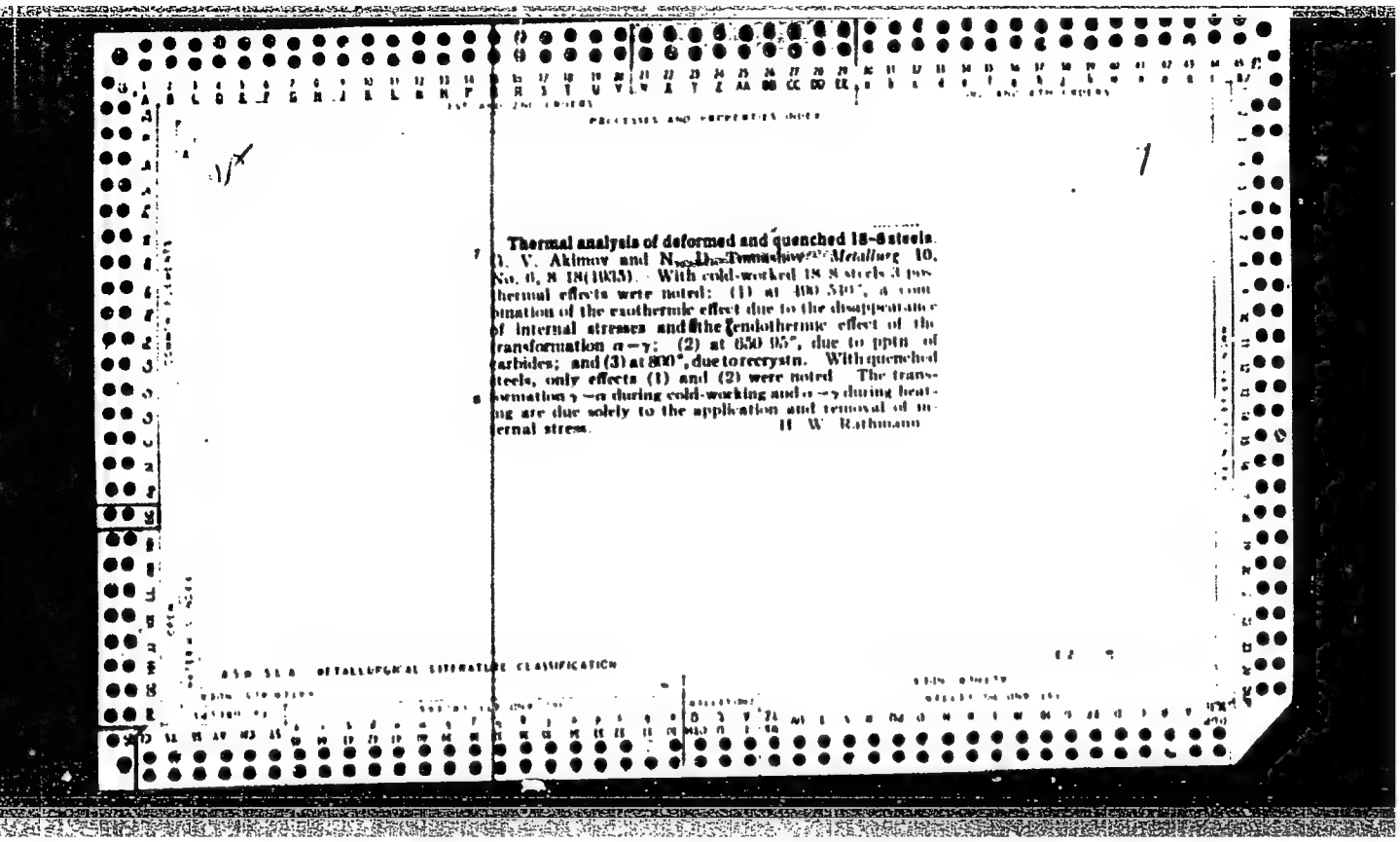
Card 2/2



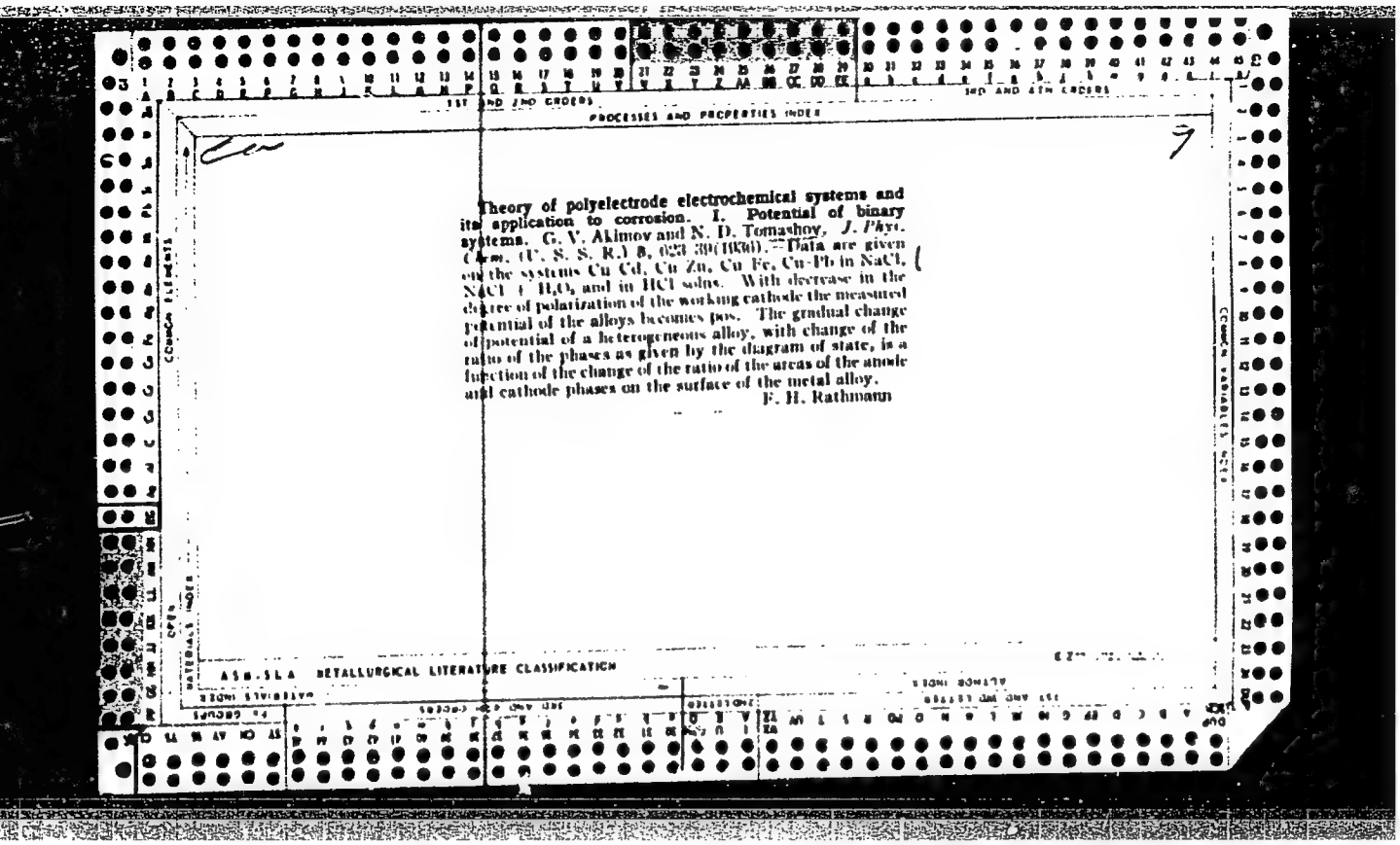
Heat Conductivity of Metals and Alloys. I.—A New Apparatus for the Determination of the Heat Conductivity of Metals. N. D. Tomashow and J. B. Fridman (*Peoples Commissariat for Heavy Industry, U.S.S.R., United Aircraft Industries: Trans. Sci. Res. Inst. Aircraft Materials*, 1934, (6), 1-19).—[In Russian, with English summary.] The apparatus comprises a cylindrical rod of the material being tested, 12 mm. in diameter and 260 mm. long, enclosed in a heat insulating protective tube and provided at one end with a small internal resistance unit for heating and at the other end with a water-cooling system. The amount of heat passing along the rod is determined from the amount of cooling water and from the electric supply to the heating unit. A series of 9 thermocouples, 4 in the rod, enables readings to be made of the temperature at all the important points of the apparatus. The accuracy of the pyrometric readings is ± 0·1° C. and of the whole apparatus ± 3%. The results obtained on copper, aluminium, "Y" alloy, and other metals are in close agreement with those of other workers.—A. ft. P.



Methods for Measuring the Thermal Conductivity of Metals. N. D. Tomashov and J. B. Fridman (*Zavodskaia Laboratoria* (*Works' Lab.*), 1935, **4**, (5), 539–547).—[In Russian.] A survey of the methods and description of installations at the All-Union Institute of Aviation Materials.—D. N. S.



Thermal analysis of deformed and quenched 18-8 steels. O. V. Akimov and N. Da. Tomashov. *Metallurg* 10, No. 6, 8-18(1935). With cold-worked 18-8 steels 3 thermal effects were noted: (1) at 480-540°, a combination of the exothermic effect due to the disappearance of internal stresses and the endothermic effect of the transformation $\alpha \rightarrow \gamma$; (2) at 650-95°, due to pptn. of carbides; and (3) at 800°, due to recrystn. With quenched steels, only effects (1) and (2) were noted. The transformation $\gamma \rightarrow \alpha$ during cold-working and $\alpha \rightarrow \gamma$ during heating are due solely to the application and removal of internal stress. H. W. Rathmann



PROCESSES AND PROPERTIES INDEX

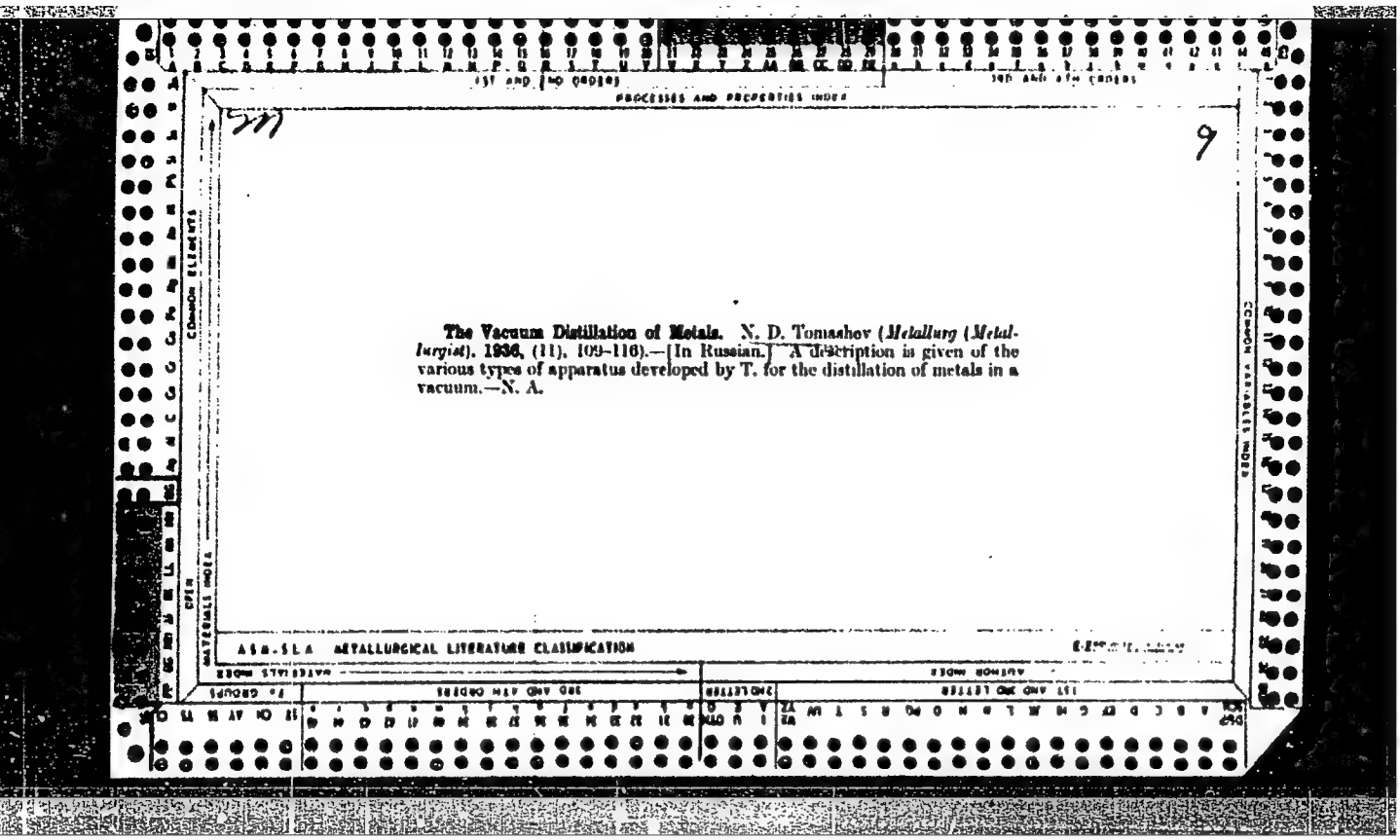
Cu

7

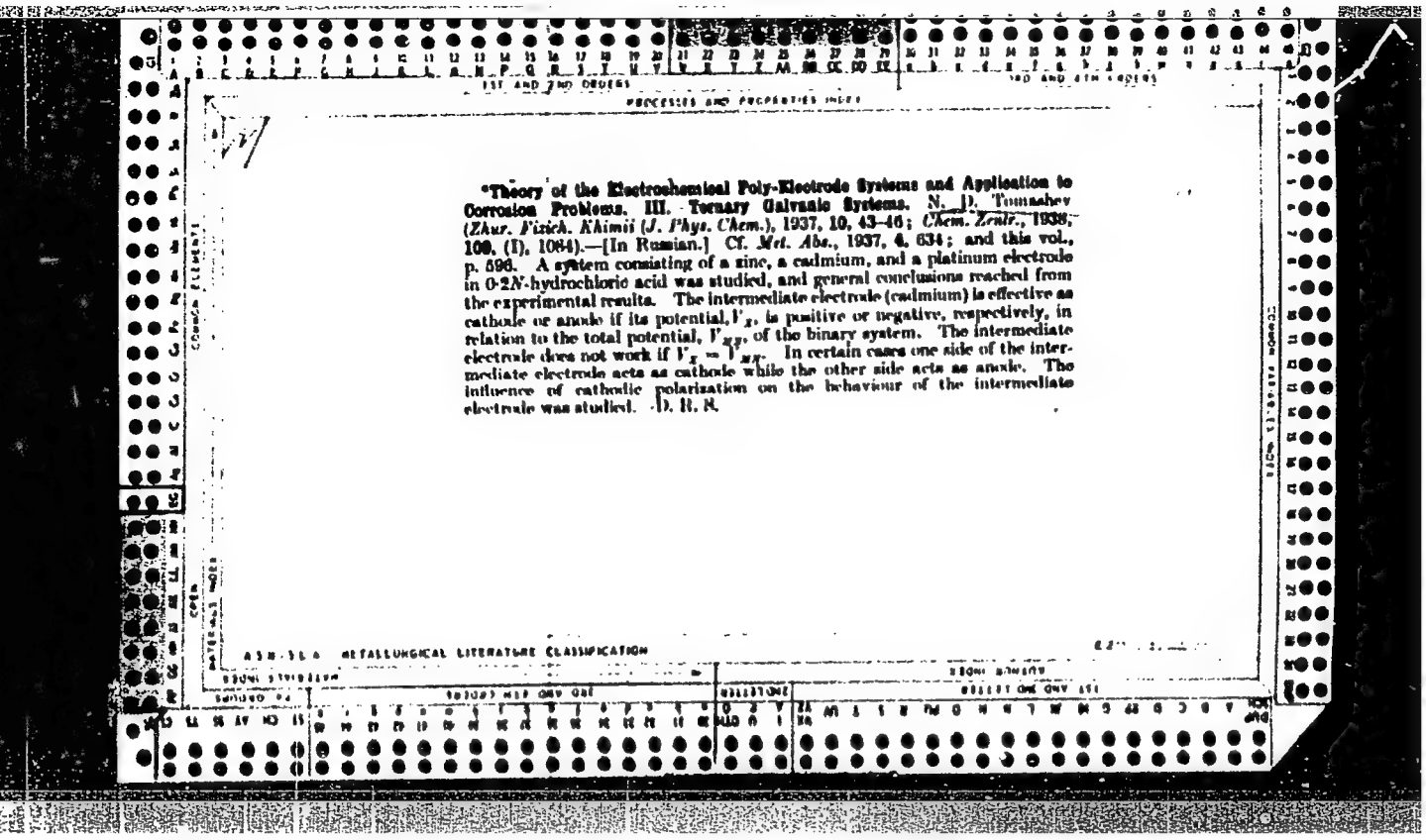
Theory of polyelectrode electrochemical systems and its application to corrosion. I. Potential of binary systems. G. V. Akimov and N. D. Tomashov, *J. Phys. Chem. (U. S. S. R.)* 8, 623-39(1936).—Data are given on the systems Cu-Cd, Cu-Zn, Cu-Fe, Cu-Pb in NaCl, NaCl + H_2O_2, and in HCl solns. With decrease in the degree of polarization of the working cathode the measured potential of the alloys becomes pos. The gradual change of potential of a heterogeneous alloy, with change of the ratio of the phases as given by the diagram of state, is a function of the change of the ratio of the areas of the anode and cathode phases on the surface of the metal alloy.

F. H. Rathmann

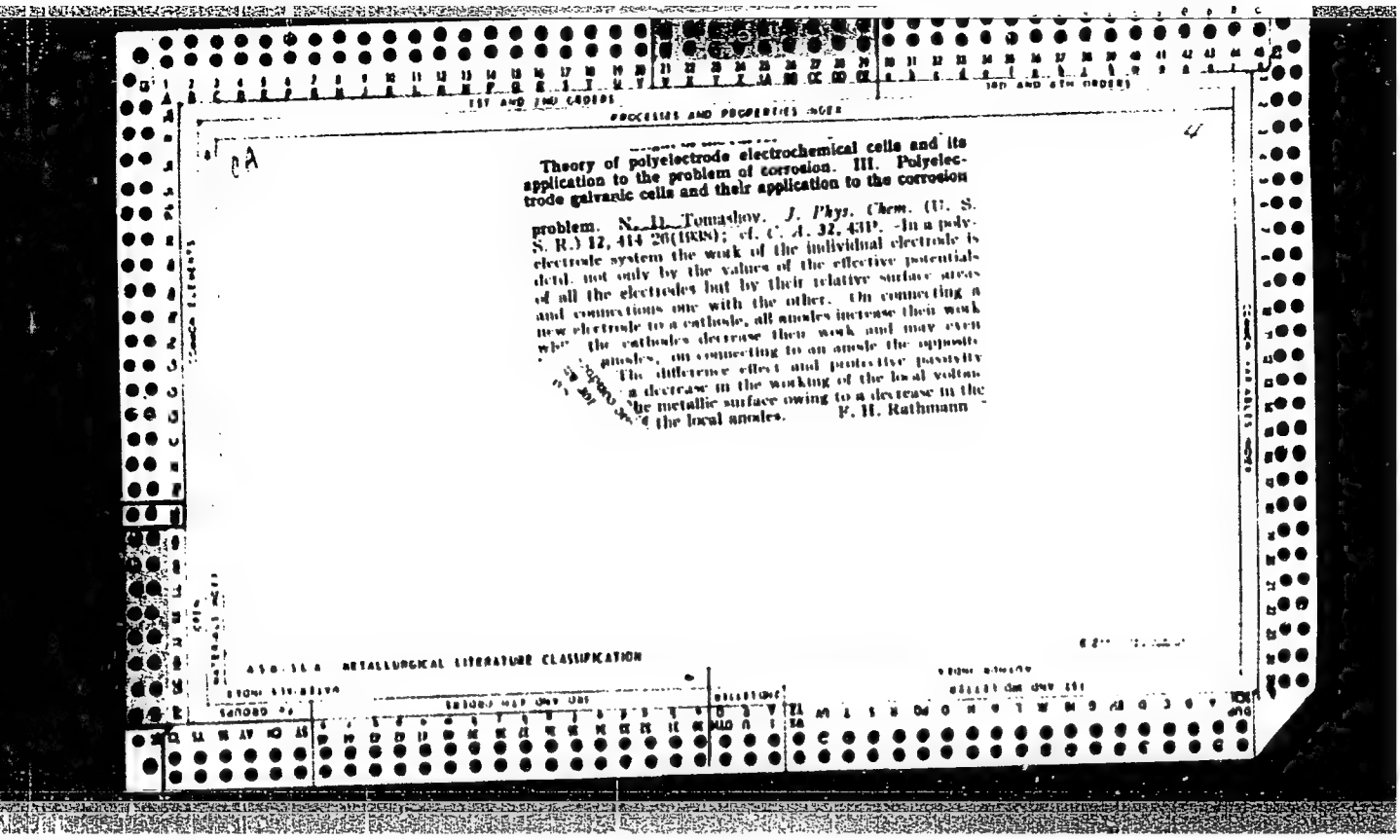
ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



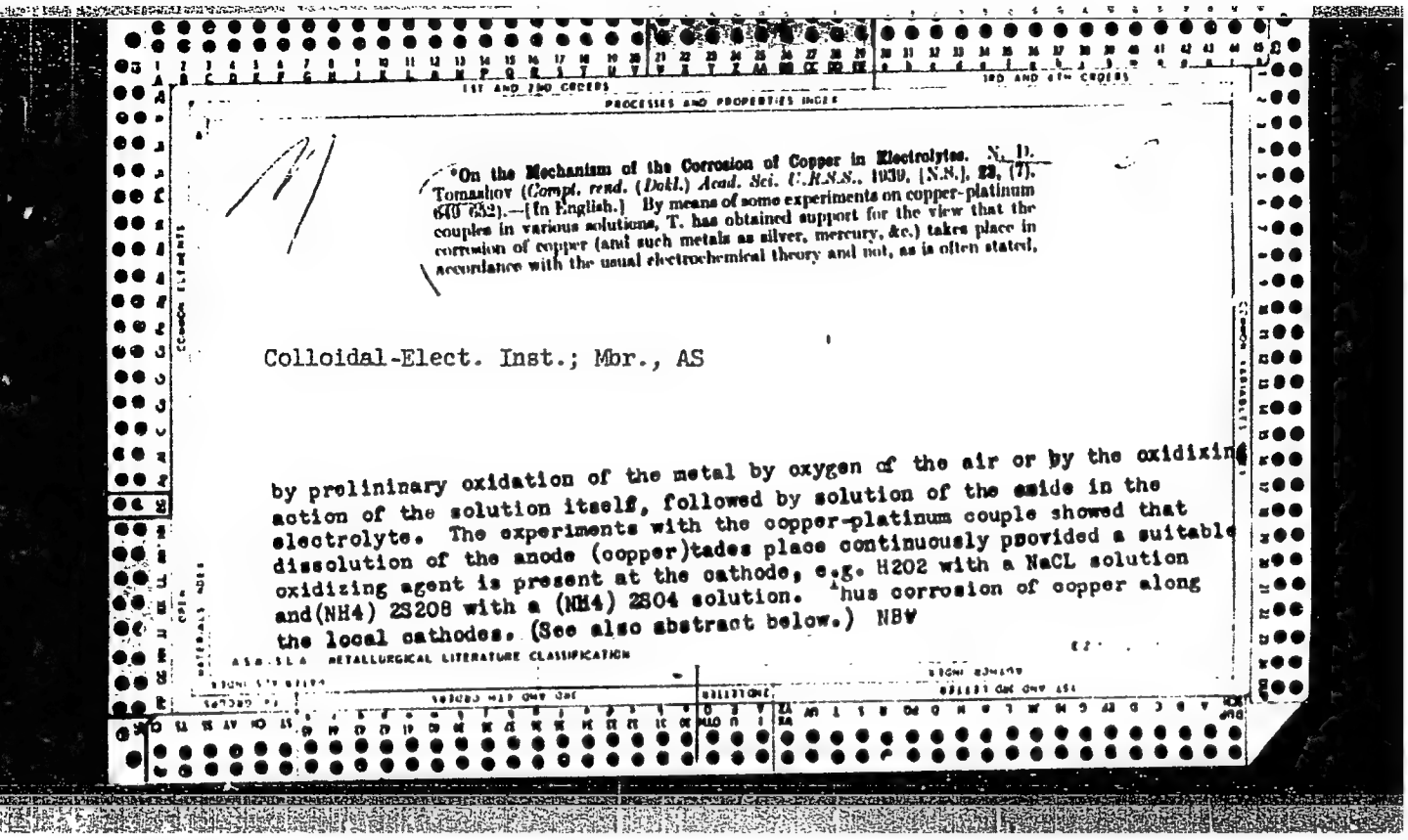
The Vacuum Distillation of Metals. N. D. Tomashov (*Metallurg* (*Metallurgist*), **1936**, (11), 109–116).—[In Russian.] A description is given of the various types of apparatus developed by T. for the distillation of metals in a vacuum.—N. A.



"Theory of the Electrochemical Poly-Electrode Systems and Application to Corrosion Problems. III. Ternary Galvanic Systems. N. D. Tomashev (*Zhur. Fizich. Khimii* (*J. Phys. Chem.*), 1937, 10, 43–46; *Chem. Zentr.*, 1938, 109, (I), 1084).—[In Russian.] Cf. *Met. Abs.*, 1937, 4, 634; and this vol., p. 596. A system consisting of a zinc, a cadmium, and a platinum electrode in 0·2*N*-hydrochloric acid was studied, and general conclusions reached from the experimental results. The intermediate electrode (cadmium) is effective as cathode or anode if its potential, V_x, is positive or negative, respectively, in relation to the total potential, V_{xy}, of the binary system. The intermediate electrode does not work if $V_x = V_{xy}$. In certain cases one side of the intermediate electrode acts as cathode while the other side acts as anode. The influence of cathodic polarization on the behaviour of the intermediate electrode was studied. D. R. S.



Theory of polyelectrode electrochemical cells and its application to the problem of corrosion. III. Polyelectrode galvanic cells and their application to the corrosion problem. N. D. Tomashov. *J. Phys. Chem.* (U. S. S. R.) 12, 414-20(1938); cf. *C. A.* 32, 431⁹. In a polyelectrode system the work of the individual electrode is detd. not only by the values of the effective potentials of all the electrodes but by their relative surface areas and connections one with the other. On connecting a new electrode to a cathode, all anodes increase their work while the cathodes decrease their work and may even become anodes, on connecting to an anode the opposite effect. The difference effect and protective passivity of a decrease in the working of the local voltaic cells on the metallic surface owing to a decrease in the surface of the local anodes. F. H. Rathmann



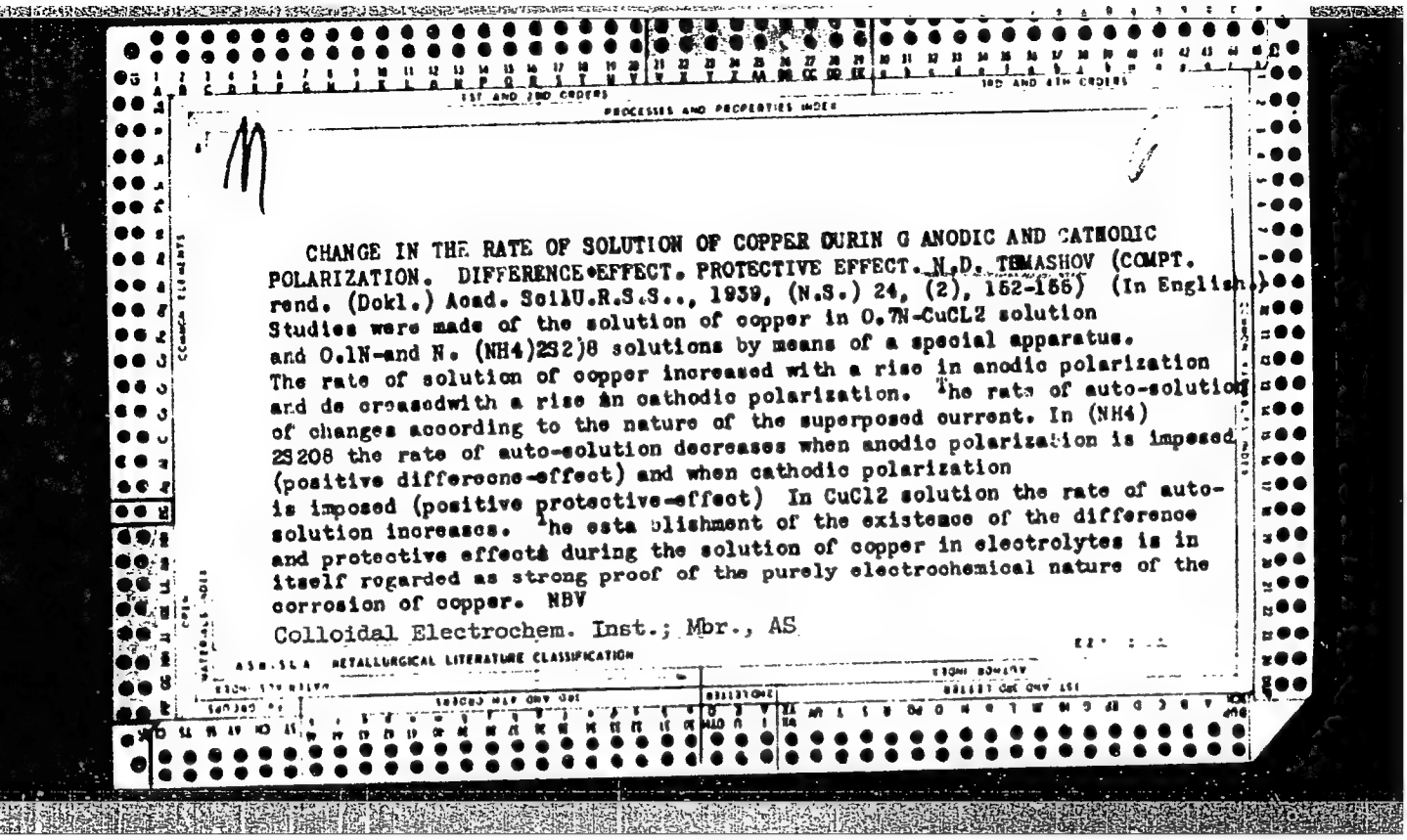
PROCESSES AND PROPERTIES INDEX

"On the Mechanism of the Corrosion of Copper in Electrolytes. N. D. Tomashov (*Compt. rend. (Dokl.) Acad. Sci. U.R.S.S.*, 1939, [N.S.], **23**, (7), 640–652).—[In English.] By means of some experiments on copper-platinum couples in various solutions, T. has obtained support for the view that the corrosion of copper (and such metals as silver, mercury, &c.) takes place in accordance with the usual electrochemical theory and not, as is often stated,

Colloidal-Elect. Inst.; Mbr., AS

by preliminary oxidation of the metal by oxygen of the air or by the oxidizing action of the solution itself, followed by solution of the oxide in the electrolyte. The experiments with the copper-platinum couple showed that dissolution of the anode (copper)tades place continuously provided a suitable oxidizing agent is present at the cathode, e.g. H2O2 with a NaCL solution and(NH4) 2S2O8 with a (NH4) 2SO4 solution. Thus corrosion of copper along the local cathodes. (See also abstract below.) NBV

A.S.M.-S.L.A. METALLURGICAL LITERATURE CLASSIFICATION



CHANGE IN THE RATE OF SOLUTION OF COPPER DURIN G ANODIC AND CATHODIC POLARIZATION. DIFFERENCE-EFFECT. PROTECTIVE EFFECT. N.D. TOMASHOV (COMPT. rend. (Dokl.) Acad. Sci.U.R.S.S.., 1939, (N.S.) 24, (2), 152-156) (In English.) Studies were made of the solution of copper in 0.7N-CuCL2 solution and 0.1N-and N. (NH4)2S2)8 solutions by means of a special apparatus. The rate of solution of copper increased with a rise in anodic polarization and de creasedwith a rise in cathodic polarization. The rate of auto-solution of changes according to the nature of the superposed current. In (NH4) 2S2O8 the rate of auto-solution decreases when anodic polarization is imposed (positive differeone-effect) and when cathodic polarization is imposed (positive protective-effect) In CuCl2 solution the rate of auto-solution increases. The esta blishment of the existence of the difference and protective effects during the solution of copper in electrolytes is in itself regarded as strong proof of the purely electrochemical nature of the corrosion of copper. NBV

Colloidal Electrochem. Inst.; Mbr., AS

TOMASHOV, N. D.

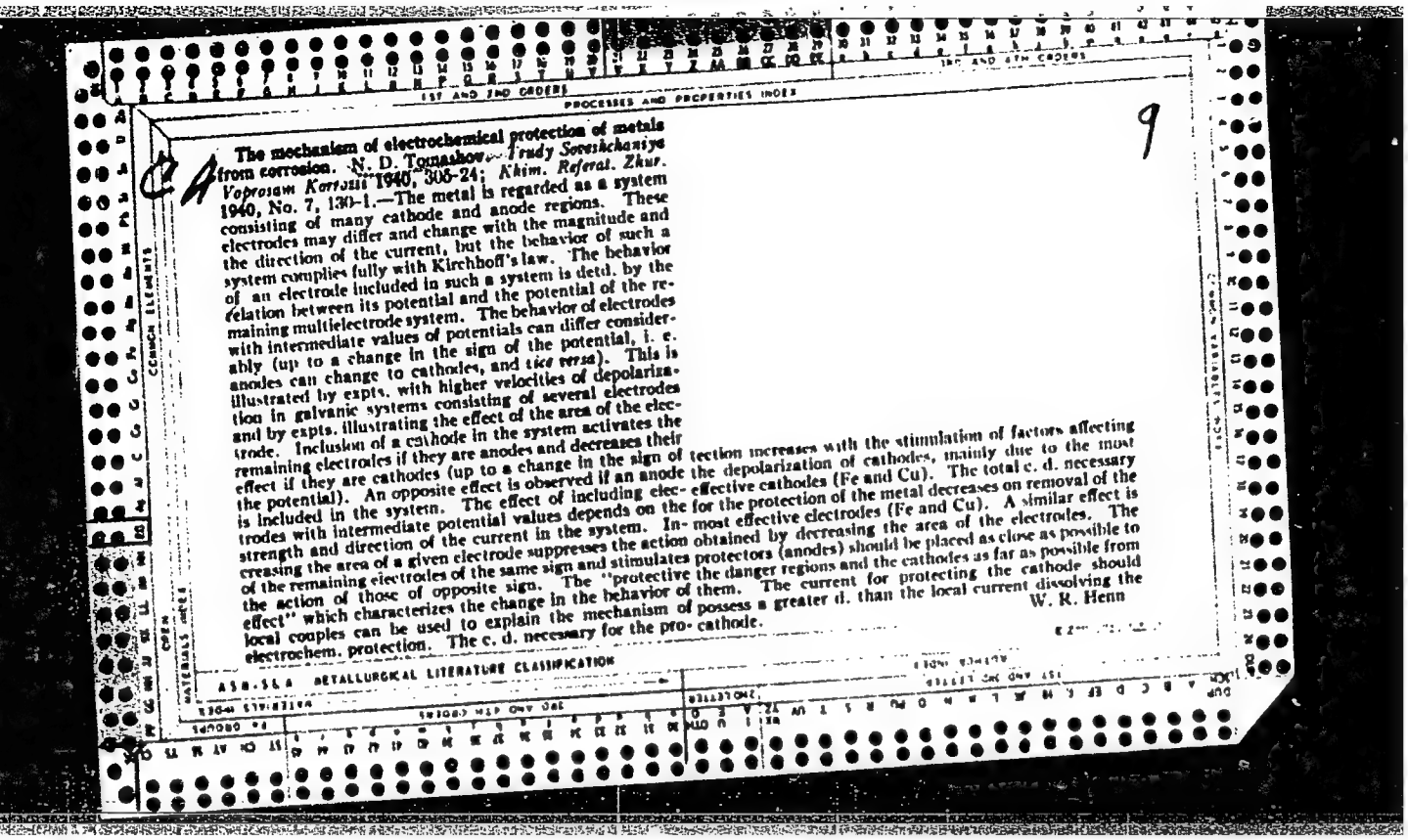
Zashchita metallicheskikh konstruktsii ot korrozii protektorami. Pod red. G. V. Akimova. Moskva, Oborongiz, 1940. 79 p. illus. (Trudy Vsesoiuznogo nauchno-issledovatel'skogo instituta aviatsionnykh materialov, vyp. 53)

Bibliography: p. 78-79.

Protection of metallic structures against corrosion by means of protectors.

DLC: TA462.T66

SO: Manufacturing and Mechanical Engineering in the Soviet Union, Library of Congress, 1953.



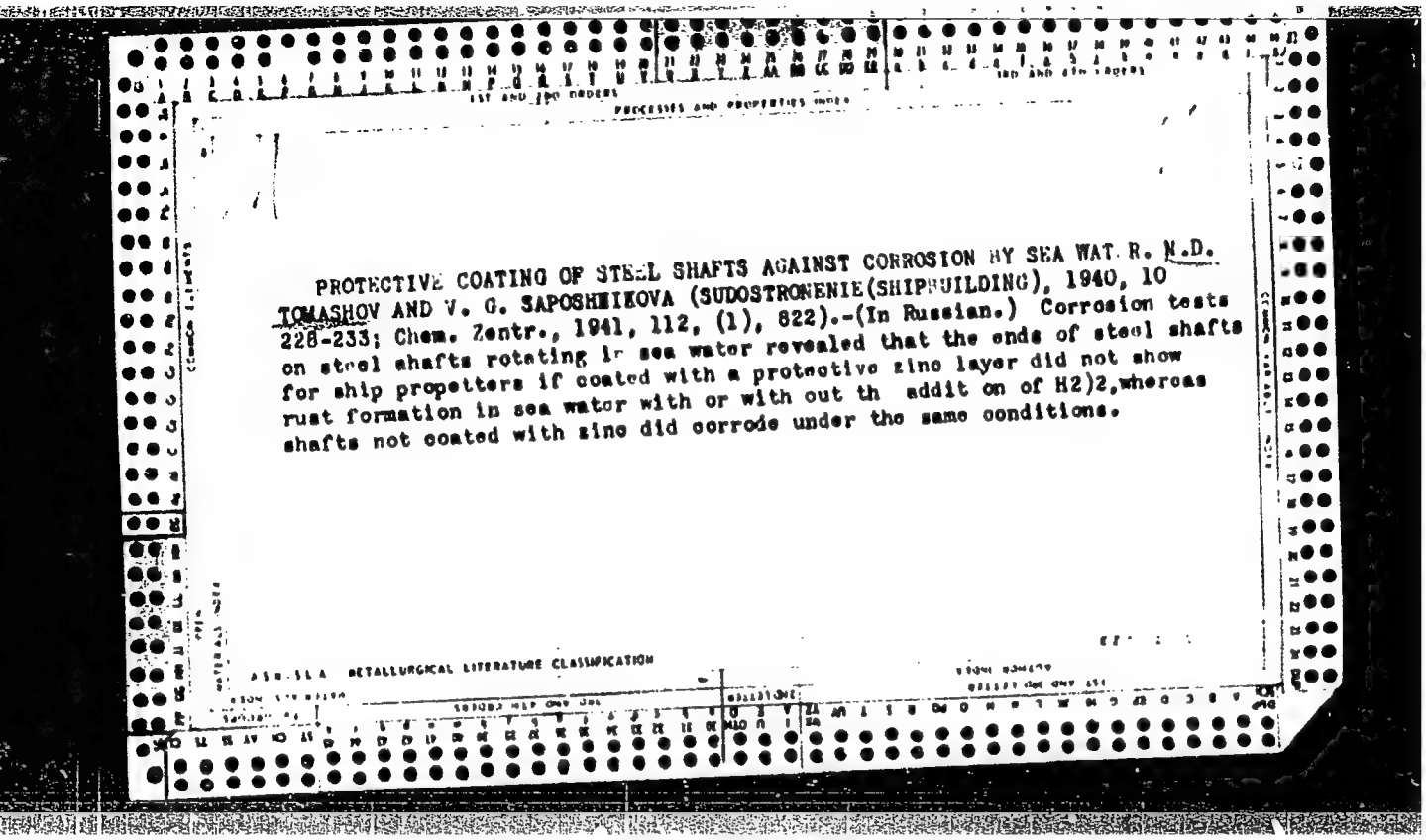
PROCESSES AND PROPERTIES INDEX

9

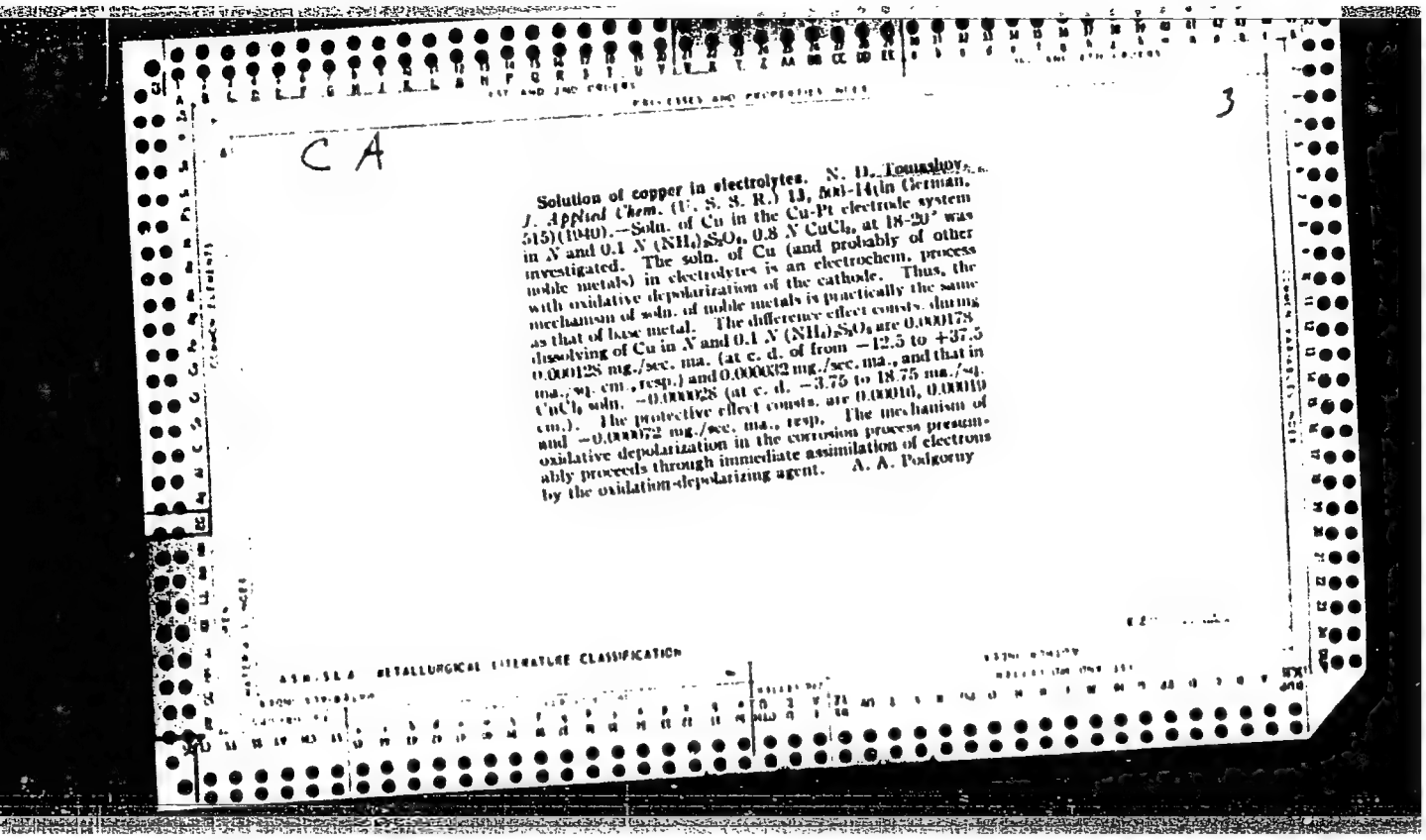
The mechanism of electrochemical protection of metals from corrosion. N. D. Tomashov. *Trudy Soveshchaniya Voprosam Korrozii* 1940, 308-24; *Khim. Referat. Zhur.* 1940, No. 7, 130-1.—The metal is regarded as a system consisting of many cathode and anode regions. These electrodes may differ and change with the magnitude and the direction of the current, but the behavior of such a system complies fully with Kirchhoff's law. The behavior of an electrode included in such a system is detd. by the relation between its potential and the potential of the remaining multielectrode system. The behavior of electrodes with intermediate values of potentials can differ considerably (up to a change in the sign of the potential, i. e. anodes can change to cathodes, and *vice versa*). This is illustrated by expts. with higher velocities of depolarization in galvanic systems consisting of several electrodes and by expts. illustrating the effect of the area of the electrode. Inclusion of a cathode in the system activates the remaining electrodes if they are anodes and decreases their effect if they are cathodes (up to a change in the sign of the potential). An opposite effect is observed if an anode is included in the system. The effect of including electrodes with intermediate potential values depends on the strength and direction of the current in the system. Increasing the area of a given electrode suppresses the action of the remaining electrodes of the same sign and stimulates the action of those of opposite sign. The "protective effect" which characterizes the change in the behavior of local couples can be used to explain the mechanism of electrochem. protection. The c. d. necessary for the protection increases with the stimulation of factors affecting the depolarization of cathodes, mainly due to the most effective cathodes (Fe and Cu). The total c. d. necessary for the protection of the metal decreases on removal of the most effective electrodes (Fe and Cu). A similar effect is obtained by decreasing the area of the electrodes. The protectors (anodes) should be placed as close as possible to the danger regions and the cathodes as far as possible from them. The current for protecting the cathode should possess a greater d. than the local current dissolving the cathode.

W. R. Henn

A58.5L8 METALLURGICAL LITERATURE CLASSIFICATION



PROTECTIVE COATING OF STEEL SHAFTS AGAINST CORROSION BY SEA WAT. R. N.D. TOMASHOV AND V. G. SAPOSHNIKOVA (SUDOSTROENIE(SHIPBUILDING), 1940, 10 228-233; Chem. Zentr., 1941, 112, (1), 822).-(In Russian.) Corrosion tests on steel shafts rotating in sea water revealed that the ends of steel shafts for ship propellers if coated with a protective zinc layer did not show rust formation in sea water with or with out th addit on of H2)2,whereas shafts not coated with zinc did corrode under the same conditions.

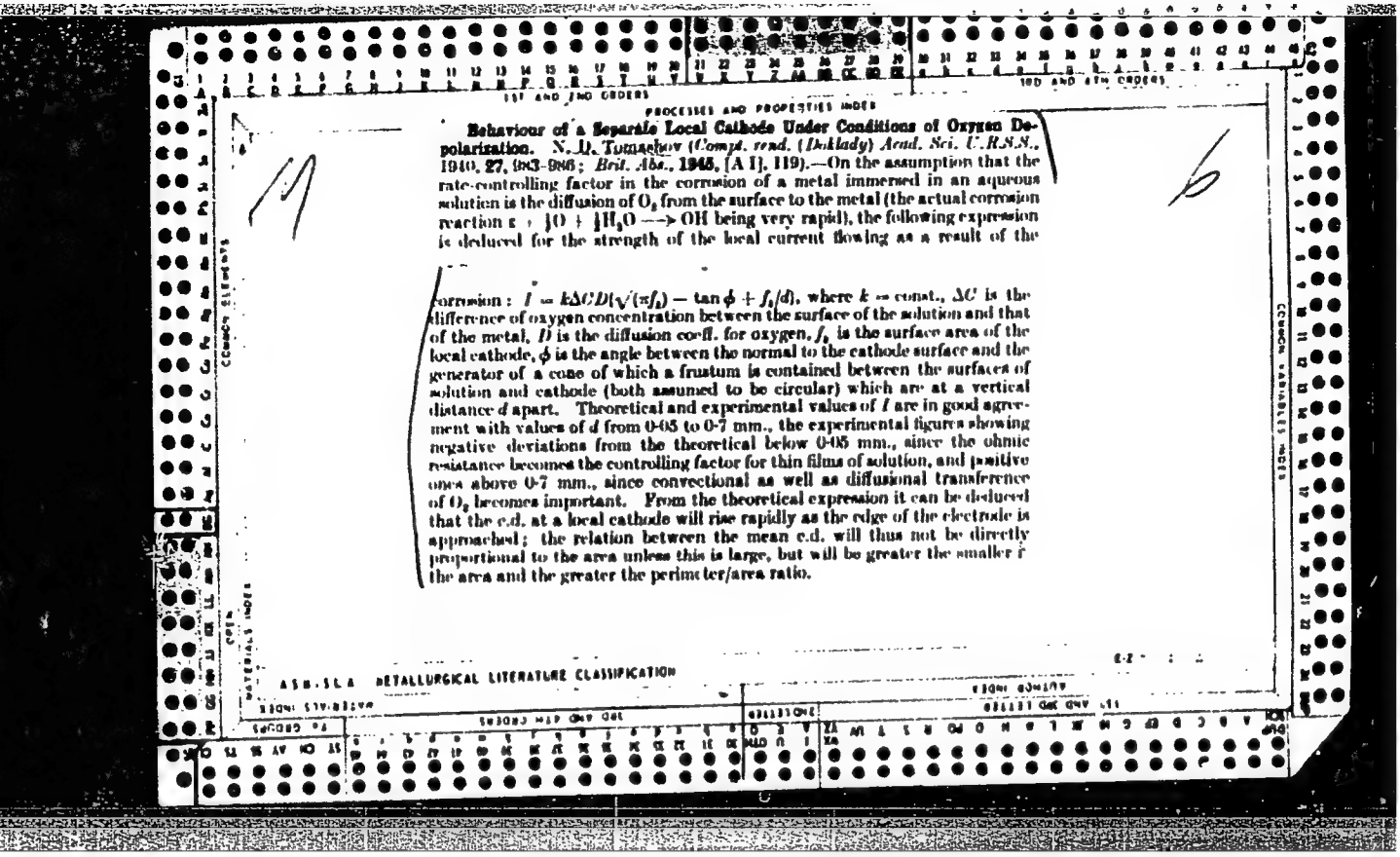


CA

3

Solution of copper in electrolytes. N. D. Tomashov. *J. Applied Chem.* (U. S. S. R.) 13, 501-14(in German, 515)(1940).—Soln. of Cu in the Cu-Pt electrode system in *N* and 0.1 *N* $(NH_4)_2S_2O_8$, 0.8 *N* $CuCl_2$ at 18-20° was investigated. The soln. of Cu (and probably of other noble metals) in electrolytes is an electrochem. process with oxidative depolarization of the cathode. Thus, the mechanism of soln. of noble metals is practically the same as that of base metal. The difference effect consts. during dissolving of Cu in *N* and 0.1 *N* $(NH_4)_2S_2O_8$ are 0.000178 0.000128 mg./sec. ma. (at c. d. of from −12.5 to +37.5 ma./sq. cm., resp.) and 0.000032 mg./sec. ma., and that in $CuCl_2$ soln. −0.000028 (at c. d. −3.75 to 18.75 ma./sq. cm.). The protective effect consts. are 0.0010, 0.0010 and −0.000072 mg./sec. ma., resp. The mechanism of oxidative depolarization in the corrosion process presumably proceeds through immediate assimilation of electrons by the oxidation-depolarizing agent. A. A. Polgorny

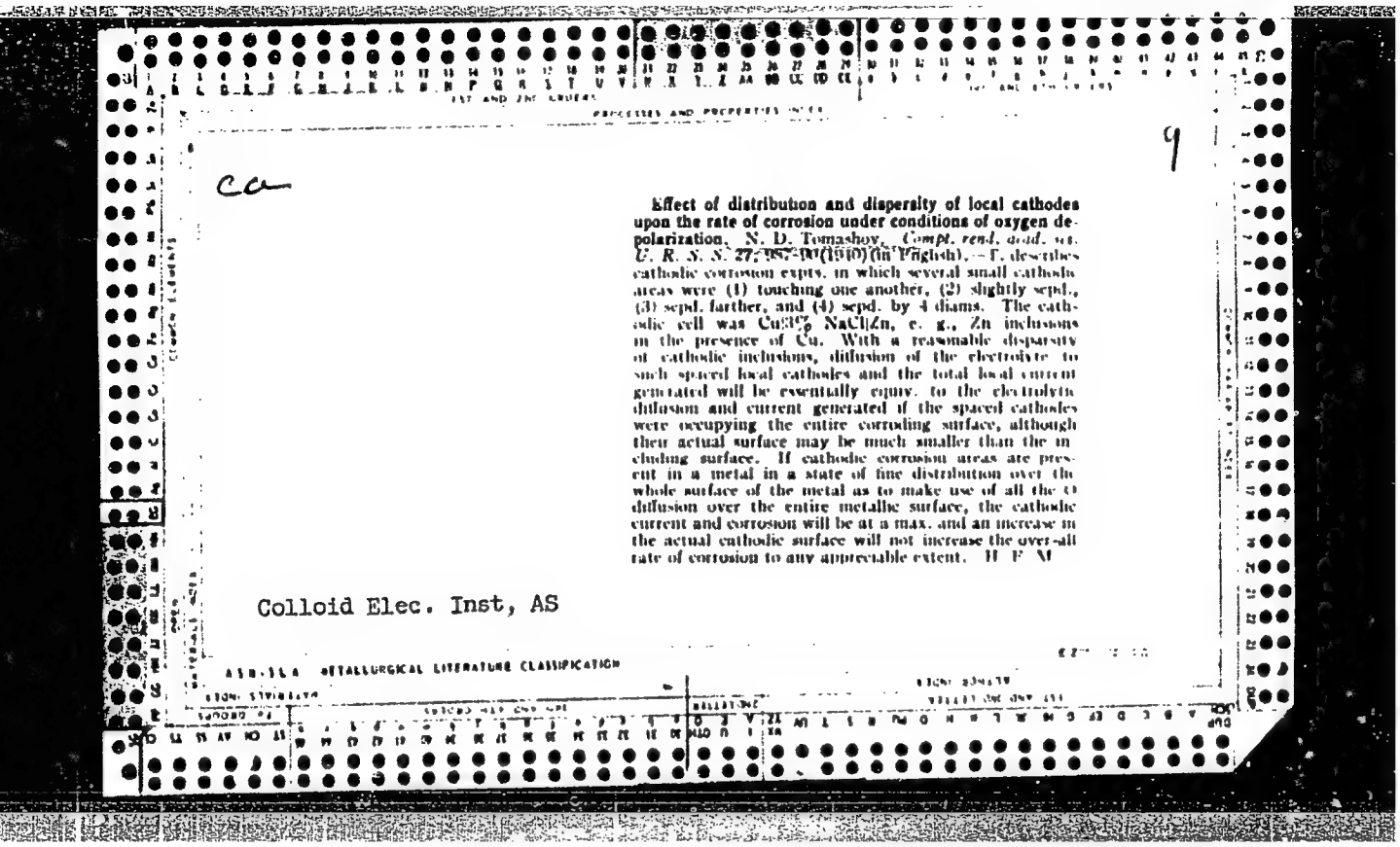
A.S.M.-S.L.A. METALLURGICAL LITERATURE CLASSIFICATION



PROCESSES AND PROPERTIES INDEX

Behaviour of a Separate Local Cathode Under Conditions of Oxygen Depolarization. N. D. Tomashov (*Compt. rend. (Doklady) Acad. Sci. U.R.S.S.*, 1940, **27**, 983–986; *Brit. Abs.*, **1945**, [A I], 119).—On the assumption that the rate-controlling factor in the corrosion of a metal immersed in an aqueous solution is the diffusion of O_2 from the surface to the metal (the actual corrosion reaction $\frac{1}{2}O_2 + \frac{1}{2}H_2O \longrightarrow OH$ being very rapid), the following expression is deduced for the strength of the local current flowing as a result of the corrosion: $I = k\Delta CD(\sqrt{(\pi f_1)} - \tan\phi + f_1/d)$, where k = const., ΔC is the difference of oxygen concentration between the surface of the solution and that of the metal, D is the diffusion coeff. for oxygen, f_1 is the surface area of the local cathode, ϕ is the angle between the normal to the cathode surface and the generator of a cone of which a frustum is contained between the surfaces of solution and cathode (both assumed to be circular) which are at a vertical distance d apart. Theoretical and experimental values of I are in good agreement with values of d from 0·05 to 0·7 mm., the experimental figures showing negative deviations from the theoretical below 0·05 mm., since the ohmic resistance becomes the controlling factor for thin films of solution, and positive ones above 0·7 mm., since convectional as well as diffusional transference of O_2 becomes important. From the theoretical expression it can be deduced that the c.d. at a local cathode will rise rapidly as the edge of the electrode is approached; the relation between the mean c.d. will thus not be directly proportional to the area unless this is large, but will be greater the smaller I the area and the greater the perimeter/area ratio.

A.S.M.-S.L.A. METALLURGICAL LITERATURE CLASSIFICATION



ca

9

Effect of distribution and dispersity of local cathodes upon the rate of corrosion under conditions of oxygen depolarization. N. D. Tomashov. *Compt. rend. acad. sci. U. R. S. S.* 27, 987-90 (1940) (in English). — T. describes cathodic corrosion expts. in which several small cathodic areas were (1) touching one another, (2) slightly sepd., (3) sepd. farther, and (4) sepd. by 4 diams. The cathodic cell was Cu|3% NaCl|Zn, e. g., Zn inclusions in the presence of Cu. With a reasonable dispersity of cathodic inclusions, diffusion of the electrolyte to such spaced local cathodes and the total local current generated will be essentially equiv. to the electrolyte diffusion and current generated if the spaced cathodes were occupying the entire corroding surface, although their actual surface may be much smaller than the including surface. If cathodic corrosion areas are present in a metal in a state of fine distribution over the whole surface of the metal as to make use of all the O diffusion over the entire metallic surface, the cathodic current and corrosion will be at a max. and an increase in the actual cathodic surface will not increase the over-all rate of corrosion to any appreciable extent. H. F. M.

Colloid Elec. Inst, AS

A58-51A METALLURGICAL LITERATURE CLASSIFICATION

11A

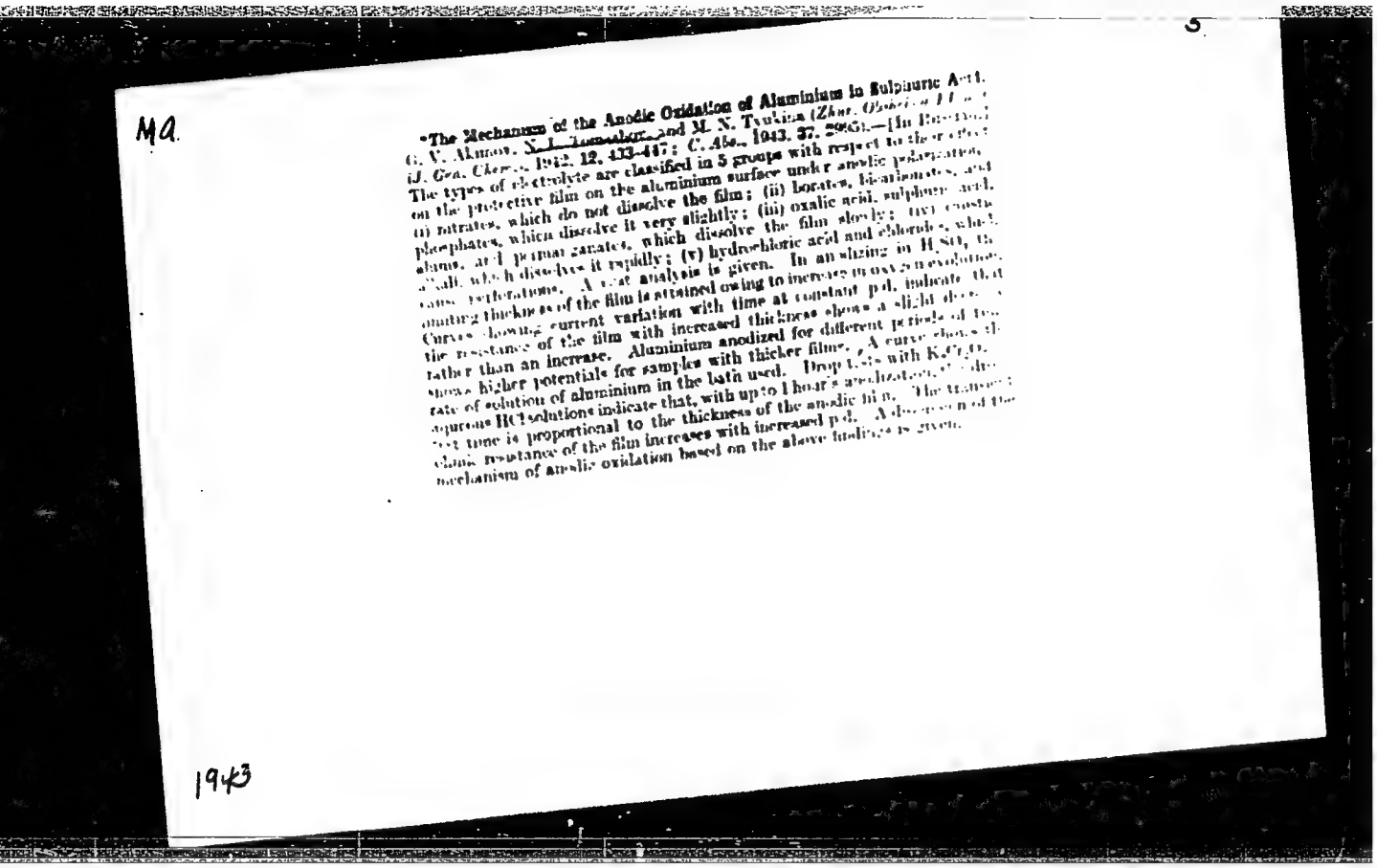
A Graphical Method of Calculating Multi-Electrode Systems as Applied to Corrosion Processes. N. D. Tomashov (*Compt. rend. (Doklady) Acad. Sci. U.R.S.S.*, 1941, 30, 621–623; *C. Abs.*, 1943, 37, 310) [In English] To make this calculation e.d. cr. voltage curves are plotted for all electrodes under conditions approaching working conditions. If the area of each electrode is known, the curves are replotted current cr. voltage on one diagram. The general potential (V_g) is the point of intersection of the summation of current-potential curves for all cathode processes and the summation curve for all anode processes within the system. The intercept along the abscissa (current) from the origin to the point at which the cathode or anode polarization curves cross the abscissa gives the direction and magnitude of the current for each electrode.

Inst. Colloid and Electrochem. AS

TOMASHOV, N. D.

"Cathodic Processes at an Iron Electrode Under the Conditions of Corrosion with Oxygen Depolarization," Dok. AN, 32, No 3, 1941.

Colloid-Electrochemical Inst.; Acad. Sci. Moscow



MA.

5

•The Mechanism of the Anodic Oxidation of Aluminium in Sulphuric Acid.
G. V. Akimov. [illegible] and M. N. Tyukina (*Zhur. Obshch. Khim.*, [illegible]
J. Gen. Chem., 1942, 12, 433-447; *C. Abs.*, 1943, 37, 2965).—[In Russian.]
The types of electrolyte are classified in 5 groups with respect to their effect
on the protective film on the aluminium surface under anodic polarisation.
(i) nitrates, which do not dissolve the film; (ii) borates, bicarbonates, and
phosphates, which dissolve it very slightly; (iii) oxalic acid, sulphuric acid,
alums, and peroxy-acids, which dissolve the film slowly; (iv) chromic acid,
alkali, which dissolves it rapidly; (v) hydrochloric acid and chlorides, which
cause perforations. A new analysis is given. In analysing in H_2SO_4, the
limiting thickness of the film is attained owing to increase in conductivity.
Curves showing current variation with time at constant p.d. indicate that
the resistance of the film with increased thickness shows a slight decrease
rather than an increase. Aluminium anodized for different periods at two
shows higher potentials for samples with thicker films. A curve shows the
rate of solution of aluminium in the bath used. Drop tests with $K_4Cr(CN)_6$
aqueous HCl solutions indicate that, with up to 1 hour's anodization, the
test time is proportional to the thickness of the anodic film. The variation
ohmic resistance of the film increases with increased p.d. A discussion of the
mechanism of anodic oxidation based on the above findings is given.

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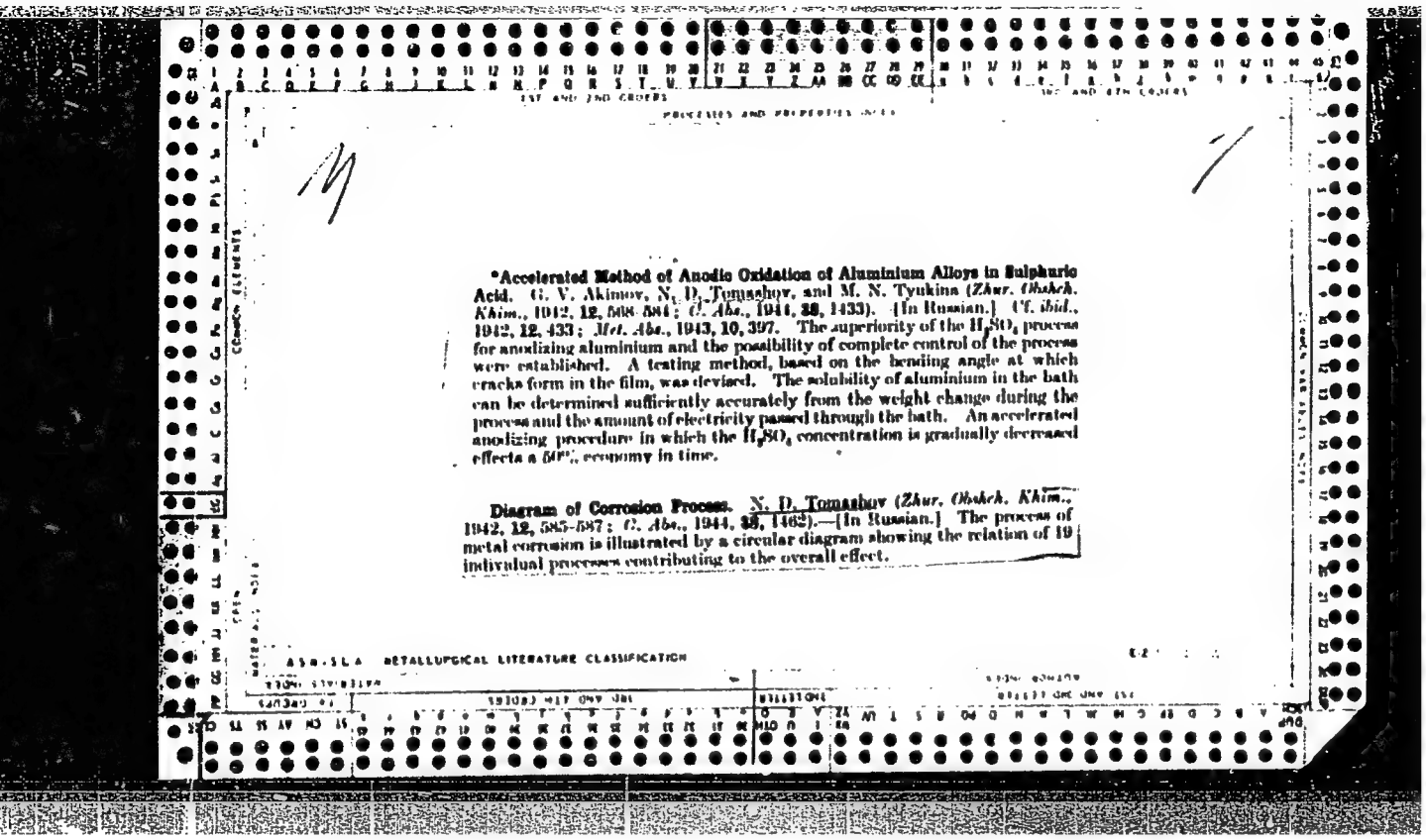
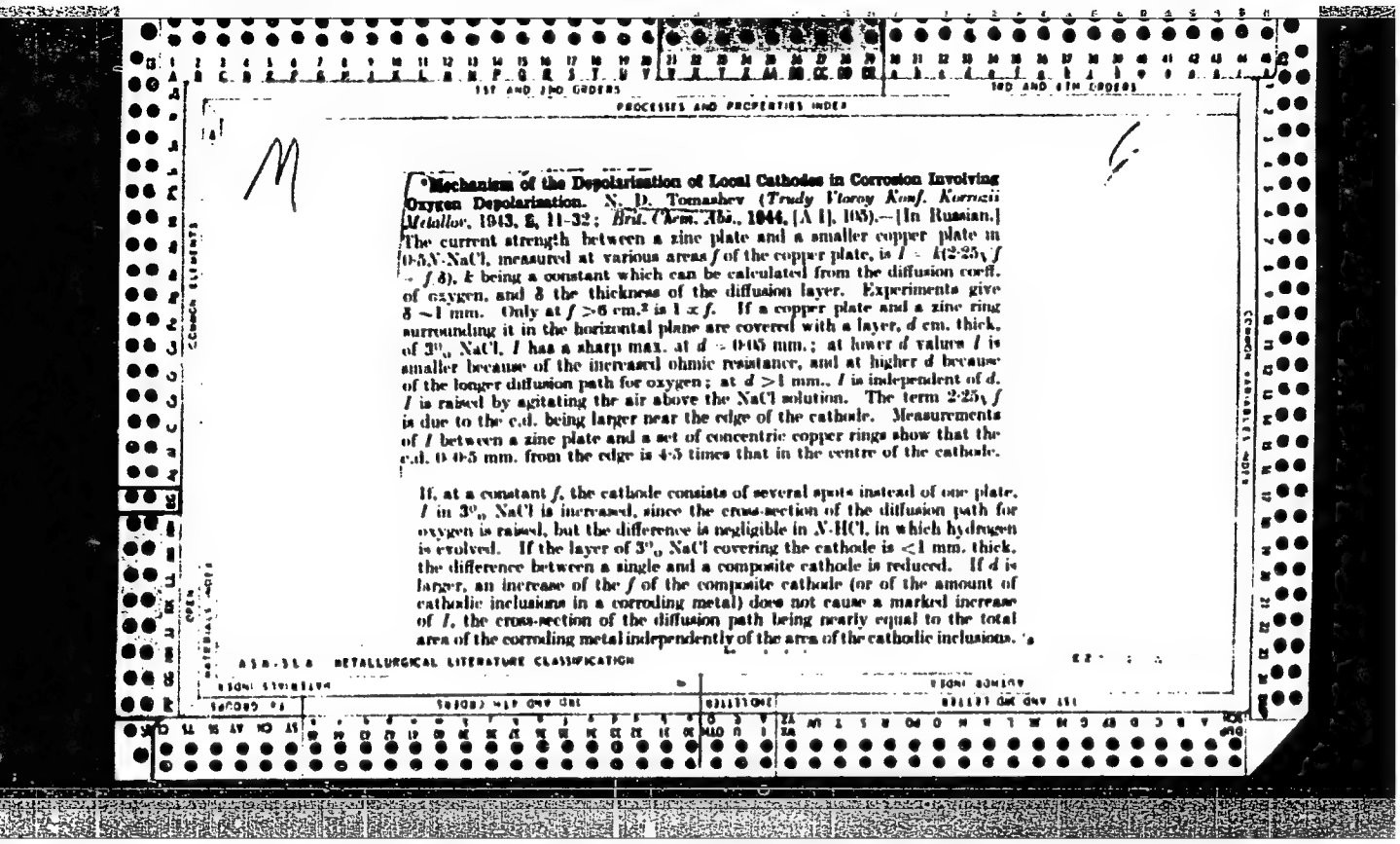


***Accelerated Method of Anodic Oxidation of Aluminium Alloys in Sulphuric Acid.** G. V. Akimov, N. D. Tomashov, and M. N. Tyukina (*Zhur. Obshch. Khim.*, 1942, **12**, 568–584; *C. Abs.*, 1944, **38**, 1433). [In Russian.] Cf. *ibid.*, 1942, **12**, 433; *Met. Abs.*, 1943, **10**, 397. The superiority of the H_2SO_4 process for anodizing aluminium and the possibility of complete control of the process were established. A testing method, based on the bending angle at which cracks form in the film, was devised. The solubility of aluminium in the bath can be determined sufficiently accurately from the weight change during the process and the amount of electricity passed through the bath. An accelerated anodizing procedure in which the H_2SO_4 concentration is gradually decreased effects a 50% economy in time.

Diagram of Corrosion Process. N. D. Tomashov (*Zhur. Obshch. Khim.*, 1942, **12**, 585–587; *C. Abs.*, 1944, **38**, 1462).—[In Russian.] The process of metal corrosion is illustrated by a circular diagram showing the relation of 19 individual processes contributing to the overall effect.

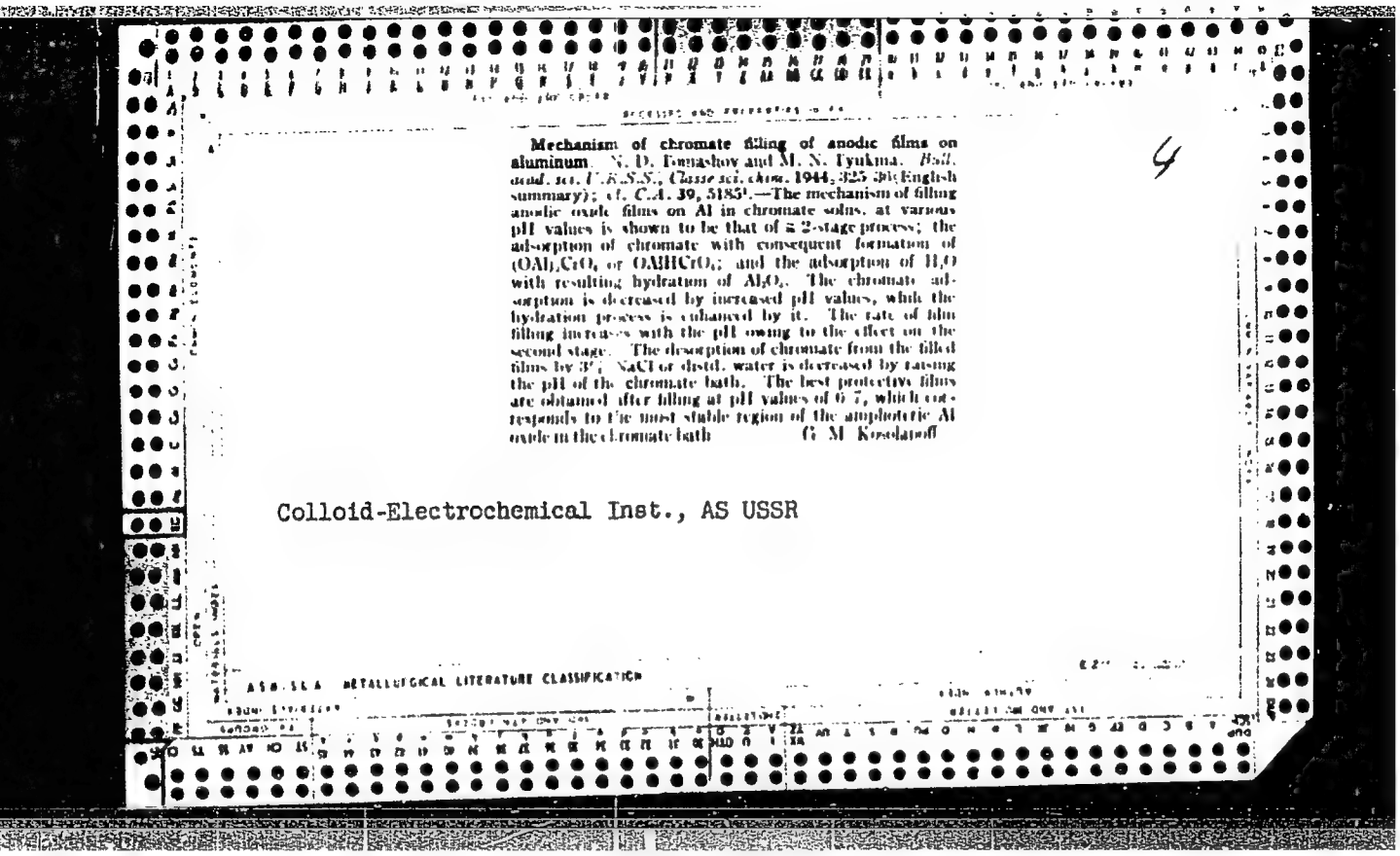


PROCESSES AND PROPERTIES INDEX

Mechanism of the Depolarisation of Local Cathodes in Corrosion Involving Oxygen Depolarisation. N. D. Tomashev (*Trudy Vtoroy Konf. Korrozii Metallov*, 1943, **2**, 11-32; *Brit. Chem. Abs.*, **1944**, [A I], 105).—[In Russian.] The current strength between a zinc plate and a smaller copper plate in 0·5*N*-NaCl, measured at various areas f of the copper plate, is $I = k(2{\cdot}25\sqrt{f} + f/\delta)$, k being a constant which can be calculated from the diffusion coeff. of oxygen, and δ the thickness of the diffusion layer. Experiments give $\delta \sim 1$ mm. Only at $f > 6$ cm.^{2} is $I \propto f$. If a copper plate and a zinc ring surrounding it in the horizontal plane are covered with a layer, d cm. thick, of 3% NaCl, I has a sharp max. at $d = 0{\cdot}05$ mm.; at lower d values I is smaller because of the increased ohmic resistance, and at higher d because of the longer diffusion path for oxygen; at $d > 1$ mm., I is independent of d. I is raised by agitating the air above the NaCl solution. The term $2{\cdot}25\sqrt{f}$ is due to the c.d. being larger near the edge of the cathode. Measurements of I between a zinc plate and a set of concentric copper rings show that the c.d. 0·05 mm. from the edge is 4·5 times that in the centre of the cathode.

If, at a constant f, the cathode consists of several spots instead of one plate, I in 3% NaCl is increased, since the cross-section of the diffusion path for oxygen is raised, but the difference is negligible in *N*-HCl, in which hydrogen is evolved. If the layer of 3% NaCl covering the cathode is <1 mm. thick, the difference between a single and a composite cathode is reduced. If d is larger, an increase of the f of the composite cathode (or of the amount of cathodic inclusions in a corroding metal) does not cause a marked increase of I, the cross-section of the diffusion path being nearly equal to the total area of the corroding metal independently of the area of the cathodic inclusions.

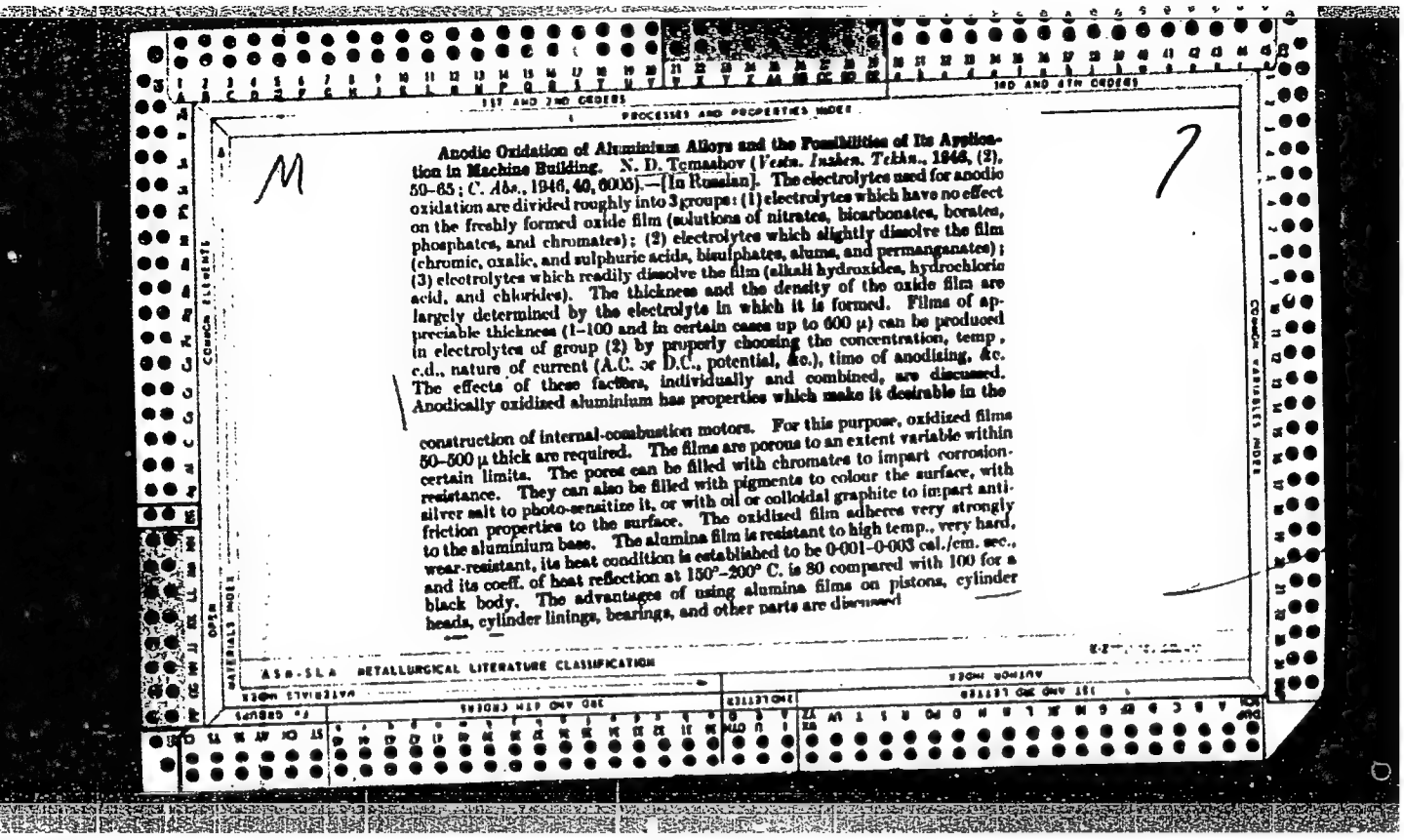
A 1 a-3 L a METALLURGICAL LITERATURE CLASSIFICATION



Mechanism of chromate filling of anodic films on aluminum. N. D. Tomashov and M. N. Tyukina. *Bull. acad. sci. U.S.S.R., Classe sci. chim.* 1944, 325-30 (English summary); *cf. C.A.* **39**, 5185[1].—The mechanism of filling anodic oxide films on Al in chromate solns. at various pH values is shown to be that of a 2-stage process; the adsorption of chromate with consequent formation of $(OAl)_2CrO_4$ or $OAlHCrO_4$; and the adsorption of H_2O with resulting hydration of Al_2O_3. The chromate adsorption is decreased by increased pH values, while the hydration process is enhanced by it. The rate of film filling increases with the pH owing to the effect on the second stage. The desorption of chromate from the filled films by 3% NaCl or distd. water is decreased by raising the pH of the chromate bath. The best protective films are obtained after filling at pH values of 6-7, which corresponds to the most stable region of the amphoteric Al oxide in the chromate bath. G. M. Kosolapoff

Colloid-Electrochemical Inst., AS USSR

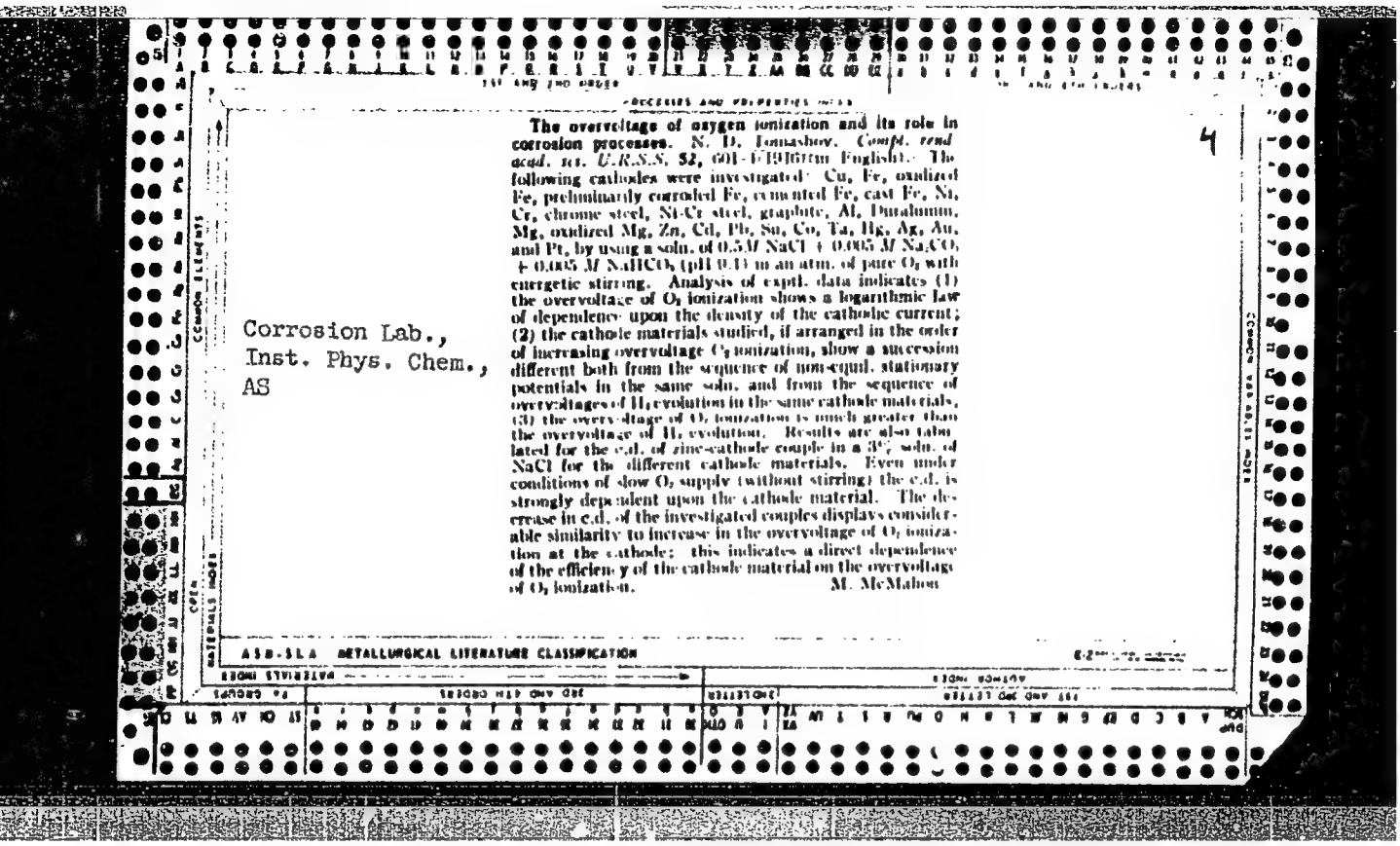
A58-51A METALLURGICAL LITERATURE CLASSIFICATION



PROCESSES AND PROPERTIES INDEX

Anodic Oxidation of Aluminium Alloys and the Possibilities of Its Application in Machine Building. N. D. Tomashov (*Vestn. Inzhen. Tekhn.*, 1946, (2), 59–65; *C. Abs.*, 1946, 40, 6005).—[In Russian]. The electrolytes used for anodic oxidation are divided roughly into 3 groups: (1) electrolytes which have no effect on the freshly formed oxide film (solutions of nitrates, bicarbonates, borates, phosphates, and chromates); (2) electrolytes which slightly dissolve the film (chromic, oxalic, and sulphuric acids, bisulphates, alums, and permanganates); (3) electrolytes which readily dissolve the film (alkali hydroxides, hydrochloric acid, and chlorides). The thickness and the density of the oxide film are largely determined by the electrolyte in which it is formed. Films of appreciable thickness (1–100 and in certain cases up to 600 μ) can be produced in electrolytes of group (2) by properly choosing the concentration, temp., c.d., nature of current (A.C. or D.C., potential, &c.), time of anodising, &c. The effects of these factors, individually and combined, are discussed. Anodically oxidized aluminium has properties which make it desirable in the construction of internal-combustion motors. For this purpose, oxidized films 50–500 μ thick are required. The films are porous to an extent variable within certain limits. The pores can be filled with chromates to impart corrosion-resistance. They can also be filled with pigments to colour the surface, with silver salt to photo-sensitize it, or with oil or colloidal graphite to impart anti-friction properties to the surface. The oxidized film adheres very strongly to the aluminium base. The alumina film is resistant to high temp., very hard, wear-resistant, its heat condition is established to be 0·001–0·003 cal./cm. sec., and its coeff. of heat reflection at 150°–200° C. is 80 compared with 100 for a black body. The advantages of using alumina films on pistons, cylinder heads, cylinder linings, bearings, and other parts are discussed

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION



The overvoltage of oxygen ionization and its role in corrosion processes. N. D. Tomashov. *Compt. rend acad. sci. U.R.S.S.* **52**, 601-4(1946)(in English).—The following cathodes were investigated: Cu, Fe, oxidized Fe, preliminarily corroded Fe, cemented Fe, cast Fe, Ni, Cr, chrome steel, Ni-Cr steel, graphite, Al, Duralumin, Mg, oxidized Mg, Zn, Cd, Pb, Sn, Co, Ta, Hg, Ag, Au, and Pt, by using a soln. of 0.5 *M* NaCl + 0.005 *M* Na_2CO_3 + 0.005 *M* $NaHCO_3$ (pH 9.1) in an atm. of pure O_2 with energetic stirring. Analysis of expt. data indicates (1) the overvoltage of O_2 ionization shows a logarithmic law of dependence upon the density of the cathodic current; (2) the cathode materials studied, if arranged in the order of increasing overvoltage O_2 ionization, show a succession different both from the sequence of non-equil. stationary potentials in the same soln. and from the sequence of overvoltages of H_2 evolution in the same cathode materials, (3) the overvoltage of O_2 ionization is much greater than the overvoltage of H_2 evolution. Results are also tabulated for the e.d. of zinc-cathode couple in a 3% soln. of NaCl for the different cathode materials. Even under conditions of slow O_2 supply (without stirring) the e.d. is strongly dependent upon the cathode material. The decrease in e.d. of the investigated couples displays considerable similarity to increase in the overvoltage of O_2 ionization at the cathode; this indicates a direct dependence of the efficiency of the cathode material on the overvoltage of O_2 ionization.

M. McMahon

Corrosion Lab.,
Inst. Phys. Chem.,
AS

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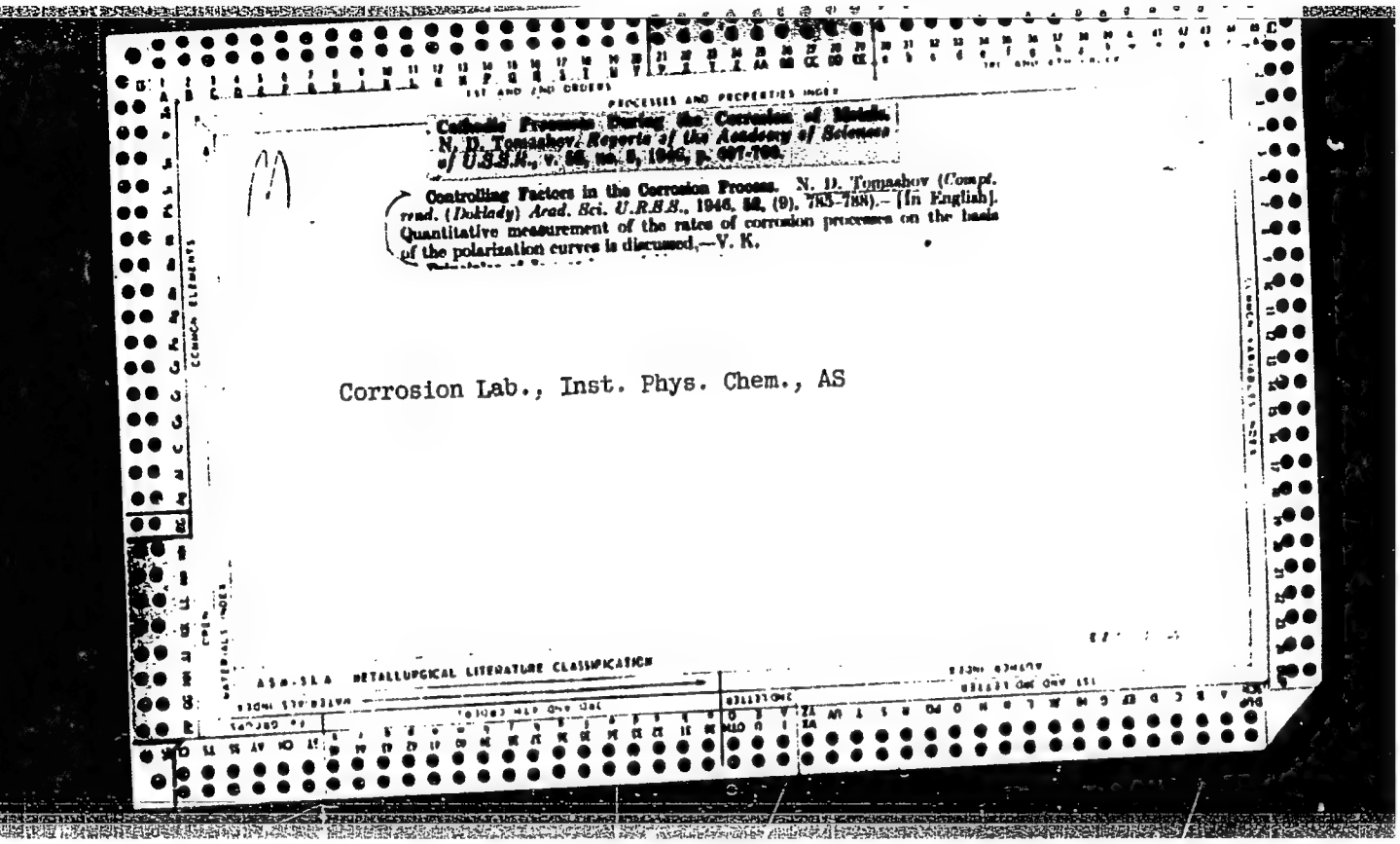
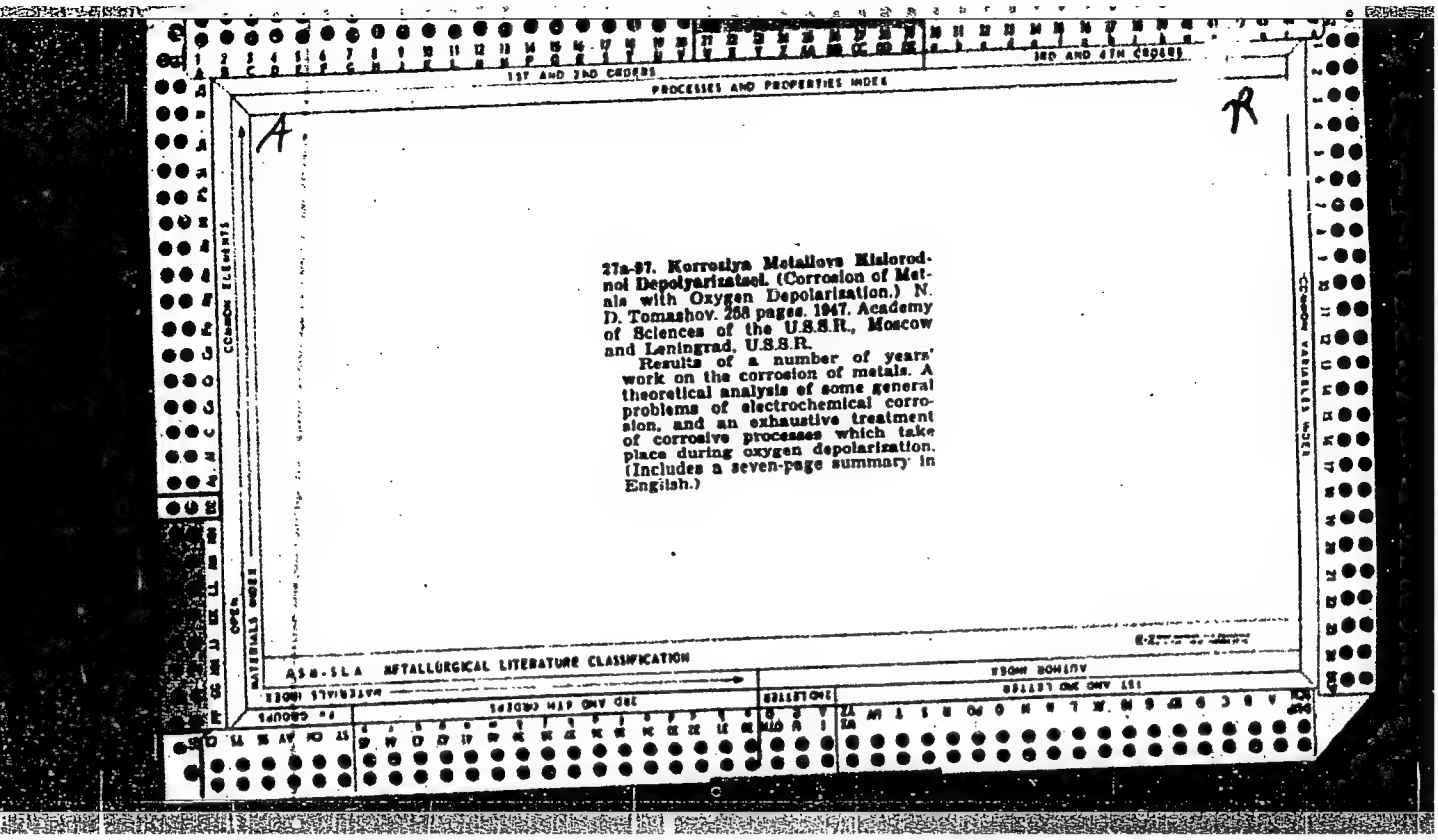
A S M - S L A METALLURGICAL LITERATURE CLASSIFICATION



Cathodic Processes During the Corrosion of Metals.
N. D. Tomashov. *Reports of the Academy of Sciences of U.S.S.R.*, v. 58, no. 5, 1946, p. 697-700.

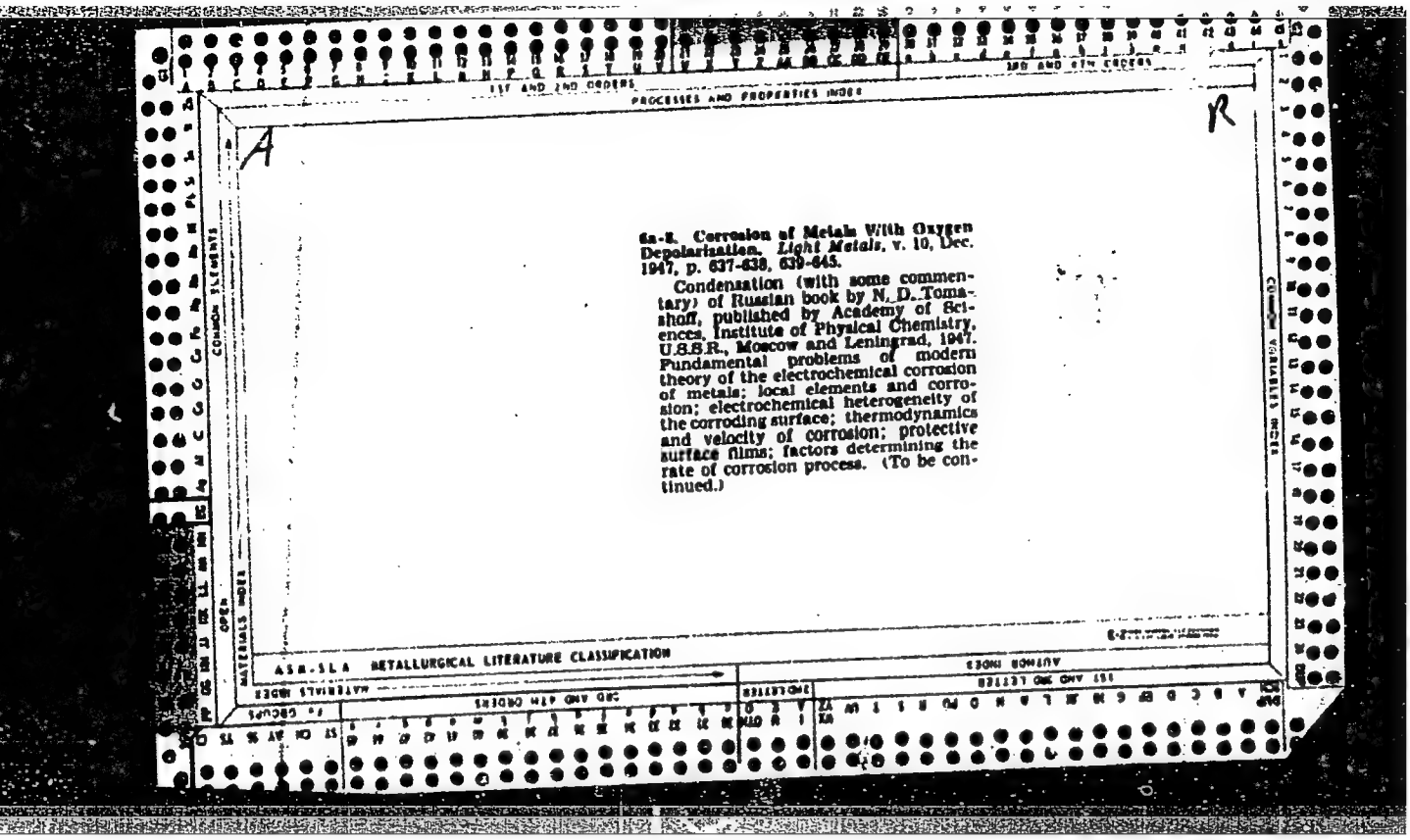
Controlling Factors in the Corrosion Process. N. D. Tomashov (*Compt. rend. (Doklady) Acad. Sci. U.R.S.S.*, 1946, **52**, (9), 783–788).—[In English]. Quantitative measurement of the rates of corrosion processes on the basis of the polarization curves is discussed.—V. K.

Corrosion Lab., Inst. Phys. Chem., AS



27a-87. **Korrozlya Metallov Kislorodnoi Depolyarizatsei.** (Corrosion of Metals with Oxygen Depolarization.) N. D. Tomashov. 288 pages. 1947. Academy of Sciences of the U.S.S.R., Moscow and Leningrad, U.S.S.R.

Results of a number of years' work on the corrosion of metals. A theoretical analysis of some general problems of electrochemical corrosion, and an exhaustive treatment of corrosive processes which take place during oxygen depolarization. (Includes a seven-page summary in English.)



6a-2. Corrosion of Metals With Oxygen Depolarization. *Light Metals*, v. 10, Dec. 1947, p. 637-638, 639-645.

Condensation (with some commentary) of Russian book by N. D. Tomashoff, published by Academy of Sciences, Institute of Physical Chemistry, U.S.S.R., Moscow and Leningrad, 1947. Fundamental problems of modern theory of the electrochemical corrosion of metals; local elements and corrosion; electrochemical heterogeneity of the corroding surface; thermodynamics and velocity of corrosion; protective surface films; factors determining the rate of corrosion process. (To be continued.)

TOMASHOV, N. D.

PA 64T67

USSR/Metals - Corrosion
Corrosion

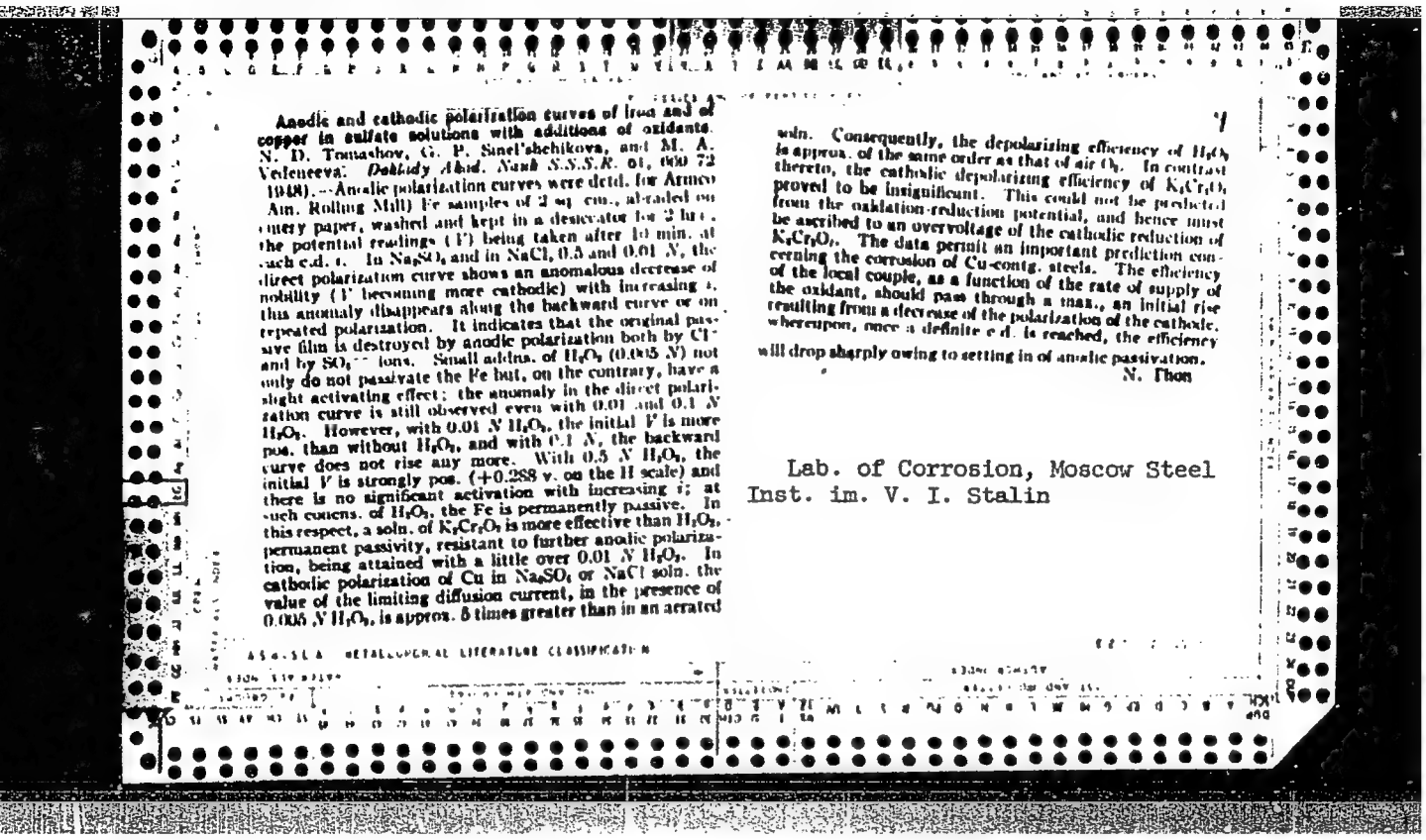
Feb 1948

"Electrochemical Investigation of the Processes of Corrosion of Metals in Solutions of Ethylene-Glycol," N. D. Tomashov, M. A. Timonova, All-Union Inst of Aviation Materials, Moscow, 11 pp

"Zhur Fiz Khim" Vol XXII, No 2 - [illegible]-121-31

Curves of cathode polarization are characteristic for the process of oxygen depolarization. Base evaluation of cathode and anode processes on quantitative calculations of analyzed polarization diagrams. Show the anode protecting mechanism action of the inhibitor. Submitted 9 Jun 1947.

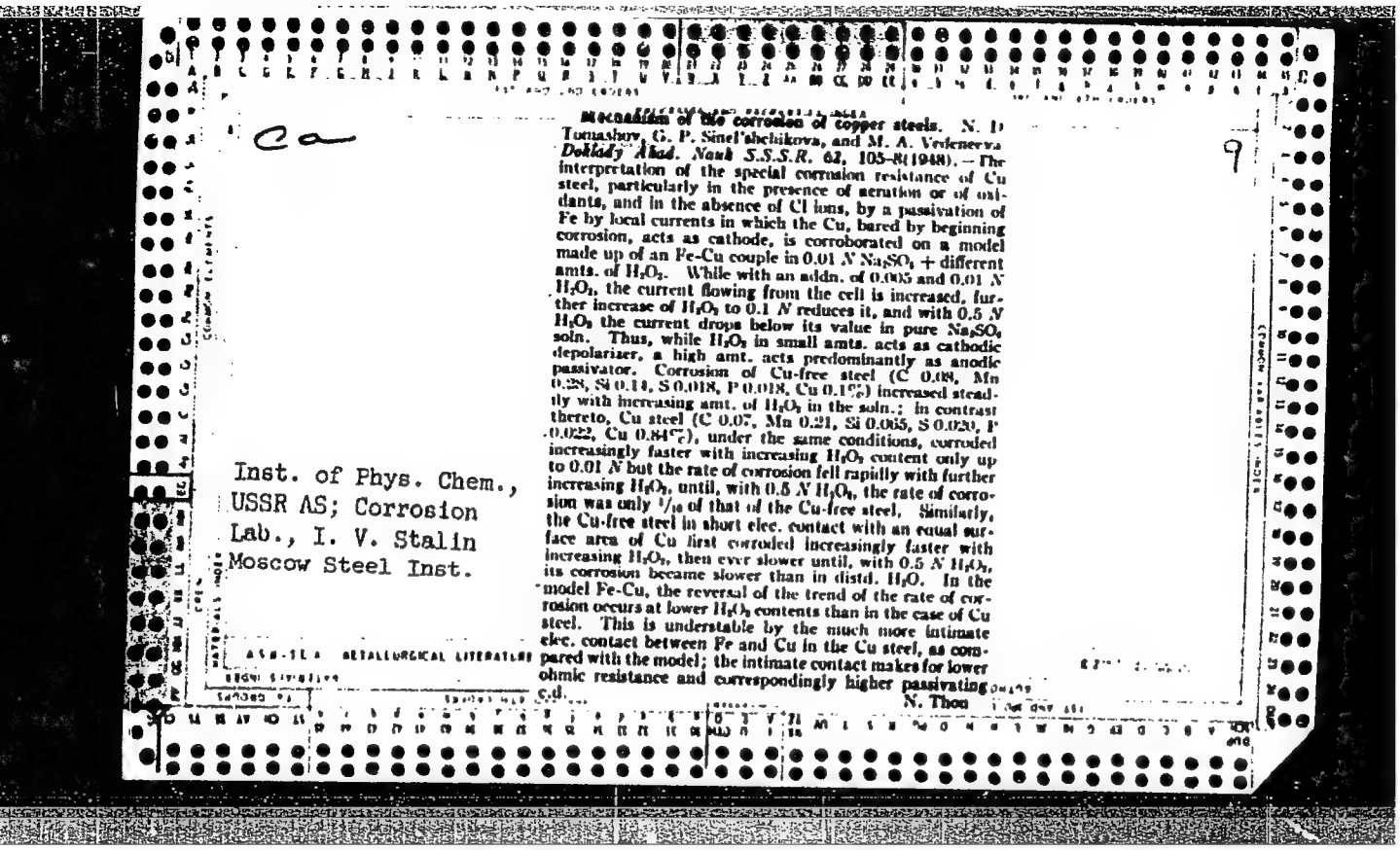
64T67



Anodic and cathodic polarization curves of iron and of copper in sulfate solutions with additions of oxidants. N. D. Tomashov, G. P. Sinel'shchikova, and M. A. Veleneeva. *Doklady Akad. Nauk S.S.S.R.* 61, 669-72 (1948).—Anodic polarization curves were detd. for Armco Am. Rolling Mill) Fe samples of 2 sq. cm., ab-raded on emery paper, washed and kept in a desiccator for 2 hrs., the potential readings (V) being taken after 10 min. at each c.d. i. In Na_2SO_4 and in NaCl, 0.5 and 0.01 N, the direct polarization curve shows an anomalous decrease of nobility (V becoming more cathodic) with increasing i, this anomaly disappears along the backward curve or on repeated polarization. It indicates that the original passive film is destroyed by anodic polarization both by Cl^- and by SO_4^{--} ions. Small addns. of H_2O_2 (0.005 N) not only do not passivate the Fe but, on the contrary, have a slight activating effect; the anomaly in the direct polarization curve is still observed even with 0.01 and 0.1 N H_2O_2. However, with 0.01 N H_2O_2, the initial V is more pos. than without H_2O_2, and with 0.1 N, the backward curve does not rise any more. With 0.5 N H_2O_2, the initial V is strongly pos. (+0.288 v. on the H scale) and there is no significant activation with increasing i; at such concns. of H_2O_2, the Fe is permanently passive. In this respect, a soln. of $K_2Cr_2O_7$ is more effective than H_2O_2. permanent passivity, resistant to further anodic polarization, being attained with a little over 0.01 N H_2O_2. In cathodic polarization of Cu in Na_2SO_4 or NaCl soln. the value of the limiting diffusion current, in the presence of 0.005 N H_2O_2, is approx. 5 times greater than in an aerated soln. Consequently, the depolarizing efficiency of H_2O_2 is approx. of the same order as that of *air* O_2. In contrast thereto, the cathodic depolarizing efficiency of $K_2Cr_2O_7$ proved to be insignificant. This could not be predicted from the oxidation-reduction potential, and hence must be ascribed to an overvoltage of the cathodic reduction of $K_2Cr_2O_7$. The data permit an important prediction concerning the corrosion of Cu-contg. steels. The efficiency of the local couple, as a function of the rate of supply of the oxidant, should pass through a max., an initial rise resulting from a decrease of the polarization of the cathode, whereupon, once a definite c.d. is reached, the efficiency will drop sharply owing to setting in of anodic passivation.

N. Thon

Lab. of Corrosion, Moscow Steel Inst. im. V. I. Stalin



Ca

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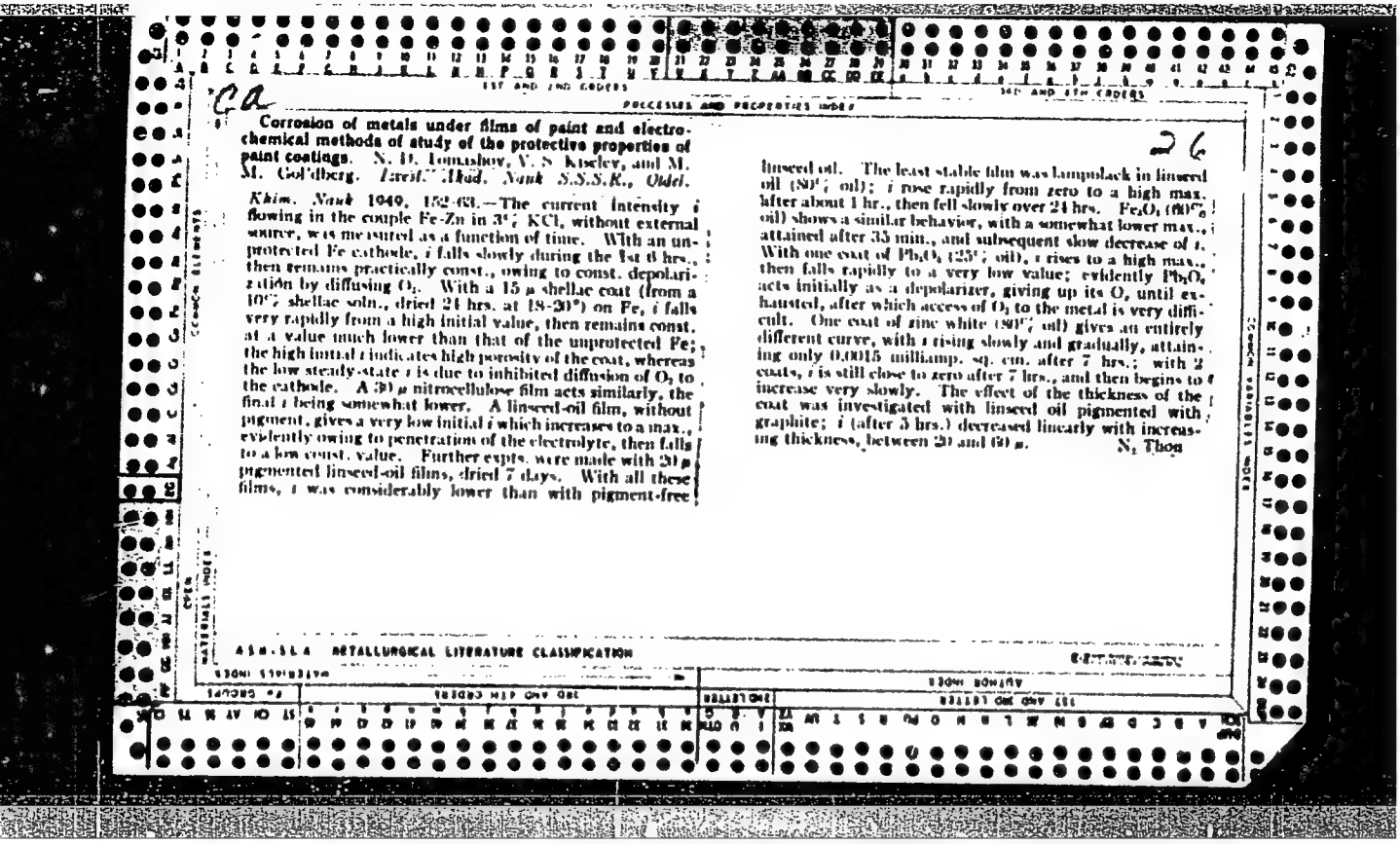
Mechanism of the corrosion of copper steels. N. D. Tomashov, G. P. Sinel'shchikova, and M. A. Vedeneeva. *Doklady Akad. Nauk S.S.S.R.* 62, 105–8(1948).—The interpretation of the special corrosion resistance of Cu steel, particularly in the presence of aeration or of oxidants, and in the absence of Cl ions, by a passivation of Fe by local currents in which the Cu, bared by beginning corrosion, acts as cathode, is corroborated on a model made up of an Fe-Cu couple in 0.01 *N* Na_2SO_3 + different amts. of H_2O_2. While with an addn. of 0.005 and 0.01 *N* H_2O_2, the current flowing from the cell is increased, further increase of H_2O_2 to 0.1 *N* reduces it, and with 0.5 *N* H_2O_2 the current drops below its value in pure Na_2SO_3 soln. Thus, while H_2O_2 in small amts. acts as cathodic depolarizer, a high amt. acts predominantly as anodic passivator. Corrosion of Cu-free steel (C 0.08, Mn 0.28, Si 0.14, S 0.018, P 0.018, Cu 0.1%) increased steadily with increasing amt. of H_2O_2 in the soln.; in contrast thereto, Cu steel (C 0.07, Mn 0.21, Si 0.065, S 0.020, P 0.022, Cu 0.84%), under the same conditions, corroded increasingly faster with increasing H_2O_2 content only up to 0.01 *N* but the rate of corrosion fell rapidly with further increasing H_2O_2, until, with 0.5 *N* H_2O_2, the rate of corrosion was only 1/10 of that of the Cu-free steel. Similarly, the Cu-free steel in short elec. contact with an equal surface area of Cu first corroded increasingly faster with increasing H_2O_2, then ever slower until, with 0.5 *N* H_2O_2, its corrosion became slower than in distd. H_2O. In the model Fe-Cu, the reversal of the trend of the rate of corrosion occurs at lower H_2O_2 contents than in the case of Cu steel. This is understable by the much more intimate elec. contact between Fe and Cu in the Cu steel, as compared with the model; the intimate contact makes for lower ohmic resistance and correspondingly higher passivating c.d. N. Thon

Inst. of Phys. Chem., USSR AS; Corrosion Lab., I. V. Stalin Moscow Steel Inst.



Ca

Corrosion of metals under films of paint and electrochemical methods of study of the protective properties of paint coatings. N. D. Tomashov, V. S. Kiselev, and M. M. Gol'dberg. *Izvest. Akad. Nauk S.S.S.R., Otdel. Khim. Nauk* 1949, 152-63.—The current intensity *i* flowing in the couple Fe-Zn in 3% KCl, without external source, was measured as a function of time. With an unprotected Fe cathode, *i* falls slowly during the 1st 6 hrs., then remains practically const., owing to const. depolarization by diffusing O_2. With a 15 μ shellac coat (from a 10% shellac soln., dried 24 hrs. at 18-20°) on Fe, *i* falls very rapidly from a high initial value, then remains const. at a value much lower than that of the unprotected Fe; the high initial *i* indicates high porosity of the coat, whereas the low steady-state *i* is due to inhibited diffusion of O_2 to the cathode. A 30 μ nitrocellulose film acts similarly, the final *i* being somewhat lower. A linseed-oil film, without pigment, gives a very low initial *i* which increases to a max., evidently owing to penetration of the electrolyte, then falls to a low const. value. Further expts. were made with 30 μ pigmented linseed-oil films, dried 7 days. With all these films, *i* was considerably lower than with pigment-free linseed oil. The least stable film was lampblack in linseed oil (80% oil); *i* rose rapidly from zero to a high max. after about 1 hr., then fell slowly over 24 hrs. Fe_2O_3 (80% oil) shows a similar behavior, with a somewhat lower max., attained after 35 min., and subsequent slow decrease of *i*. With one coat of Pb_3O_4 (25% oil), *i* rises to a high max., then falls rapidly to a very low value; evidently Pb_3O_4 acts initially as a depolarizer, giving up its O, until exhausted, after which access of O_2 to the metal is very difficult. One coat of zinc white (80% oil) gives an entirely different curve, with *i* rising slowly and gradually, attaining only 0.0015 milliamp. sq. cm. after 7 hrs.; with 2 coats, *i* is still close to zero after 7 hrs., and then begins to increase very slowly. The effect of the thickness of the coat was investigated with linseed oil pigmented with graphite; *i* (after 5 hrs.) decreased linearly with increasing thickness, between 20 and 60 μ. N. Thon

26

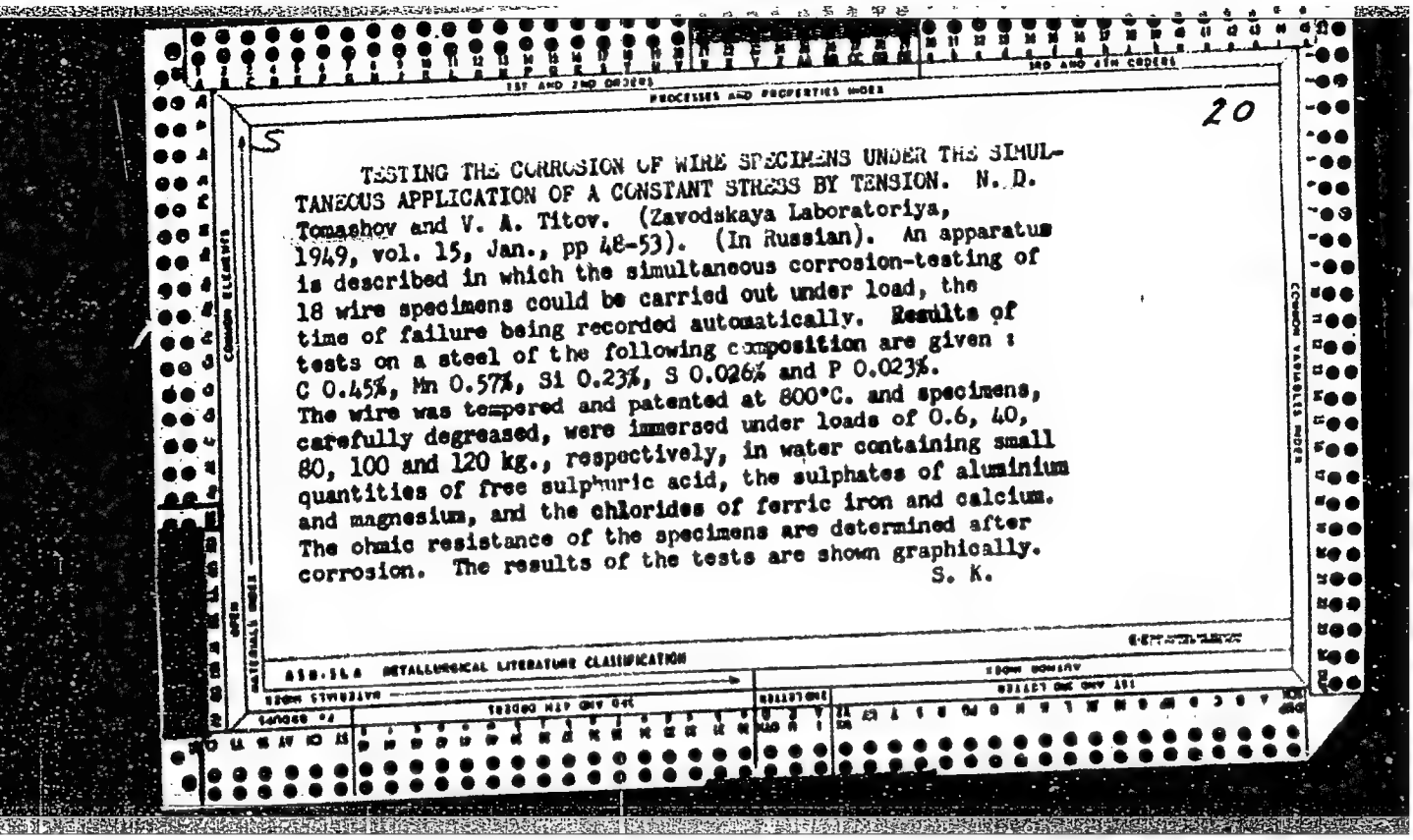
TOMASHOV, N. D.

"The Corrosion of Metals Under a Lac-Dyed Coating," Iz. Ak. Nauk SSSR Otdel Khim Nauk 2, 1949.

Inst. of Phys. Chem., AS: Moscow Chemico-Technological Inst. imeni D. I. Mendeleyev

27133. GOL'DBERG, M. M. TOMASHOV, N. D.-- Elektrokhimicheskiy metod ispytaniya antikorrozionnykh svoystv lakokrasochnoy plenki. Zavodskaya laboratoriya, 1949, No. 8, c. 951-55--Bibliogr: 8 nazv.

SO: Letopis' Zhurnal'nykh Statey, Vol. 36, 1949



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TESTING THE CORROSION OF WIRE SPECIMENS UNDER THE SIMULTANEOUS APPLICATION OF A CONSTANT STRESS BY TENSION. N. D. Tomashov and V. A. Titov. (Zavodskaya Laboratoriya, 1949, vol. 15, Jan., pp 48-53). (In Russian). An apparatus is described in which the simultaneous corrosion-testing of 18 wire specimens could be carried out under load, the time of failure being recorded automatically. Results of tests on a steel of the following composition are given : C 0.45%, Mn 0.57%, Si 0.23%, S 0.026% and P 0.023%. The wire was tempered and patented at 800°C. and specimens, carefully degreased, were immersed under loads of 0.6, 40, 80, 100 and 120 kg., respectively, in water containing small quantities of free sulphuric acid, the sulphates of aluminium and magnesium, and the chlorides of ferric iron and calcium. The ohmic resistance of the specimens are determined after corrosion. The results of the tests are shown graphically.

S. K.

TOMASHOV, N. D.

PA 65/49T13

USSR/Chemistry - Lacquer, Film Corrosion — Aug 49

"Electrochemical Method for Testing Anticorrosive Properties of Lacquer Films," M. M. Goldberg, N. D. Tomashov, Moscow Ord of Lenin Chemicotechnol Inst imeni D. I. Mendeleyev, 4 pp

"Zavod Lab" Vol XV, No 8 pp 951-55

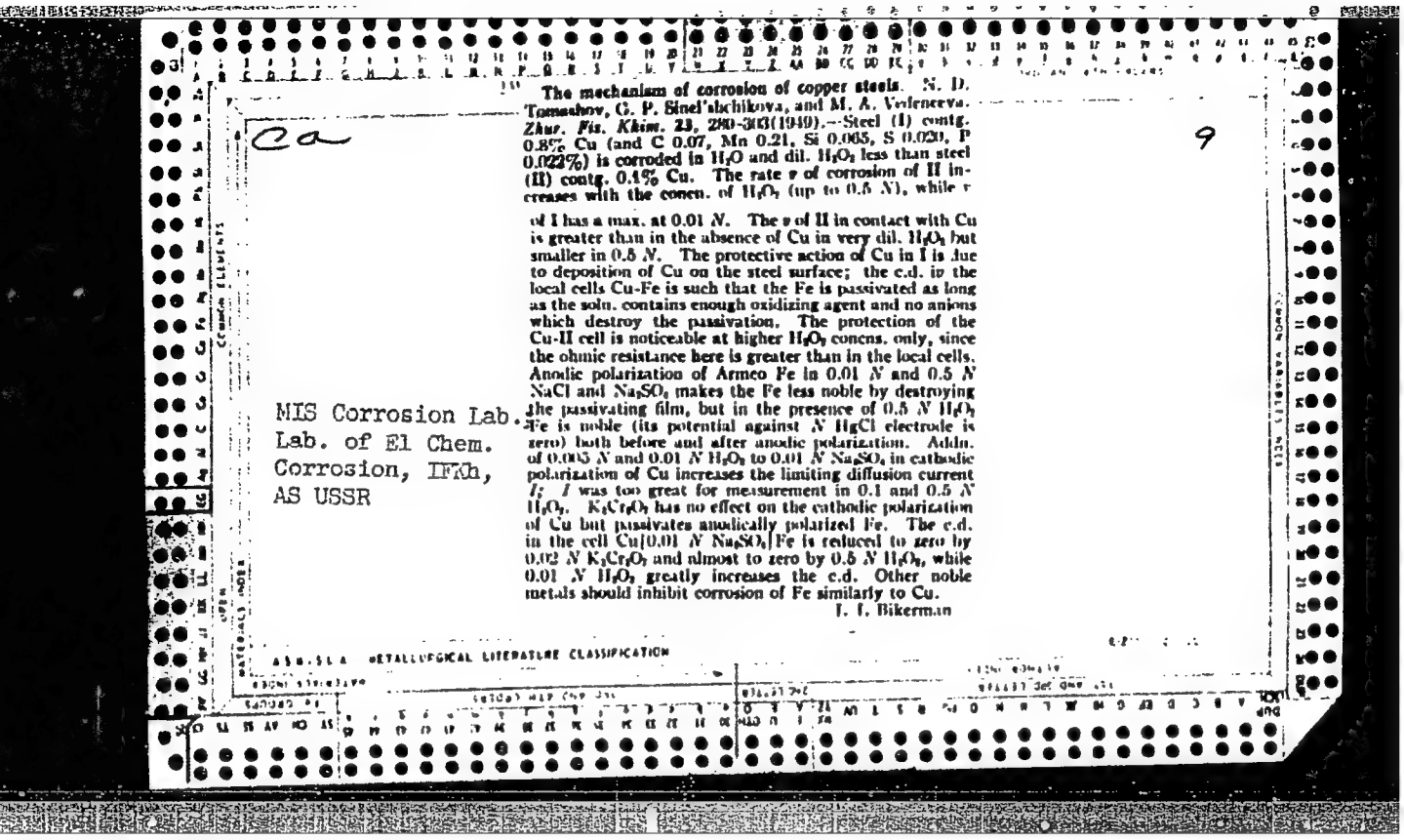
Authors used zinc and iron electrodes and a 3% calcium chloride solution which served as a corrosion medium. Electrodes were carefully prepared and then inserted in solution with standard separation of 3 cm. A galvanometer and timing

[redacted] 65/49T13

USSR/Chemistry - Lacquer, Film (Contd) — Aug 49

device gave data from which current-time curves were plotted.

[redacted] 65/49T13



Ca

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The mechanism of corrosion of copper steels. N. D. Tomashov, G. P. Sinel'shchikova, and M. A. Veĭrnceva. *Zhur. Fiz. Khim.* **23**, 289-303(1949).—Steel (I) contg. 0.8% Cu (and C 0.07, Mn 0.21, Si 0.065, S 0.020, P 0.022%) is corroded in H_2O and dil. H_2O_2 less than steel (II) contg. 0.1% Cu. The rate *v* of corrosion of II increases with the concn. of H_2O_2 (up to 0.5 *N*), while *v* of I has a max. at 0.01 *N*. The *v* of II in contact with Cu is greater than in the absence of Cu in very dil. H_2O_2 but smaller in 0.5 *N*. The protective action of Cu in I is due to deposition of Cu on the steel surface; the c.d. in the local cells Cu-Fe is such that the Fe is passivated as long as the soln. contains enough oxidizing agent and no anions which destroy the passivation. The protection of the Cu-II cell is noticeable at higher H_2O_2 concns. only, since the ohmic resistance here is greater than in the local cells. Anodic polarization of Armco Fe in 0.01 *N* and 0.5 *N* NaCl and Na_2SO_4 makes the Fe less noble by destroying the passivating film, but in the presence of 0.5 *N* H_2O_2 Fe is noble (its potential against *N* HgCl electrode is zero) both before and after anodic polarization. Addn. of 0.005 *N* and 0.01 *N* H_2O_2 to 0.01 *N* Na_2SO_4 in cathodic polarization of Cu increases the limiting diffusion current I_l; I_l was too great for measurement in 0.1 and 0.5 *N* H_2O_2. $K_2Cr_2O_7$ has no effect on the cathodic polarization of Cu but passivates anodically polarized Fe. The c.d. in the cell Cu|0.01 *N* Na_2SO_4|Fe is reduced to zero by 0.02 *N* $K_2Cr_2O_7$ and almost to zero by 0.5 *N* H_2O_2, while 0.01 *N* H_2O_2 greatly increases the c.d. Other noble metals should inhibit corrosion of Fe similarly to Cu.

I. I. Bikerman

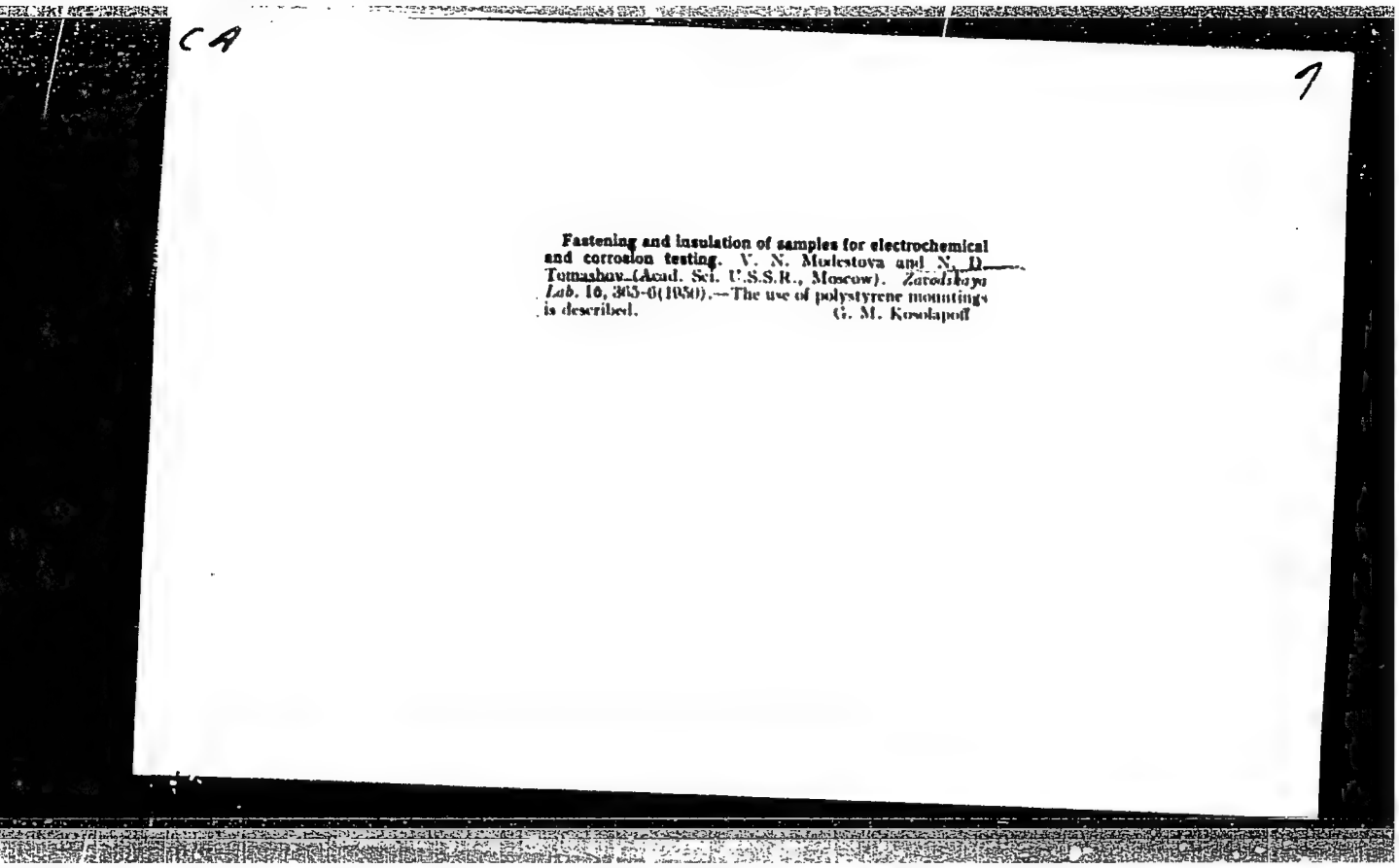
MIS Corrosion Lab.
Lab. of El Chem.
Corrosion, IFKh,
AS USSR

A S M - S L A METALLURGICAL LITERATURE CLASSIFICATION

J. of S.A.S.

Corrosion

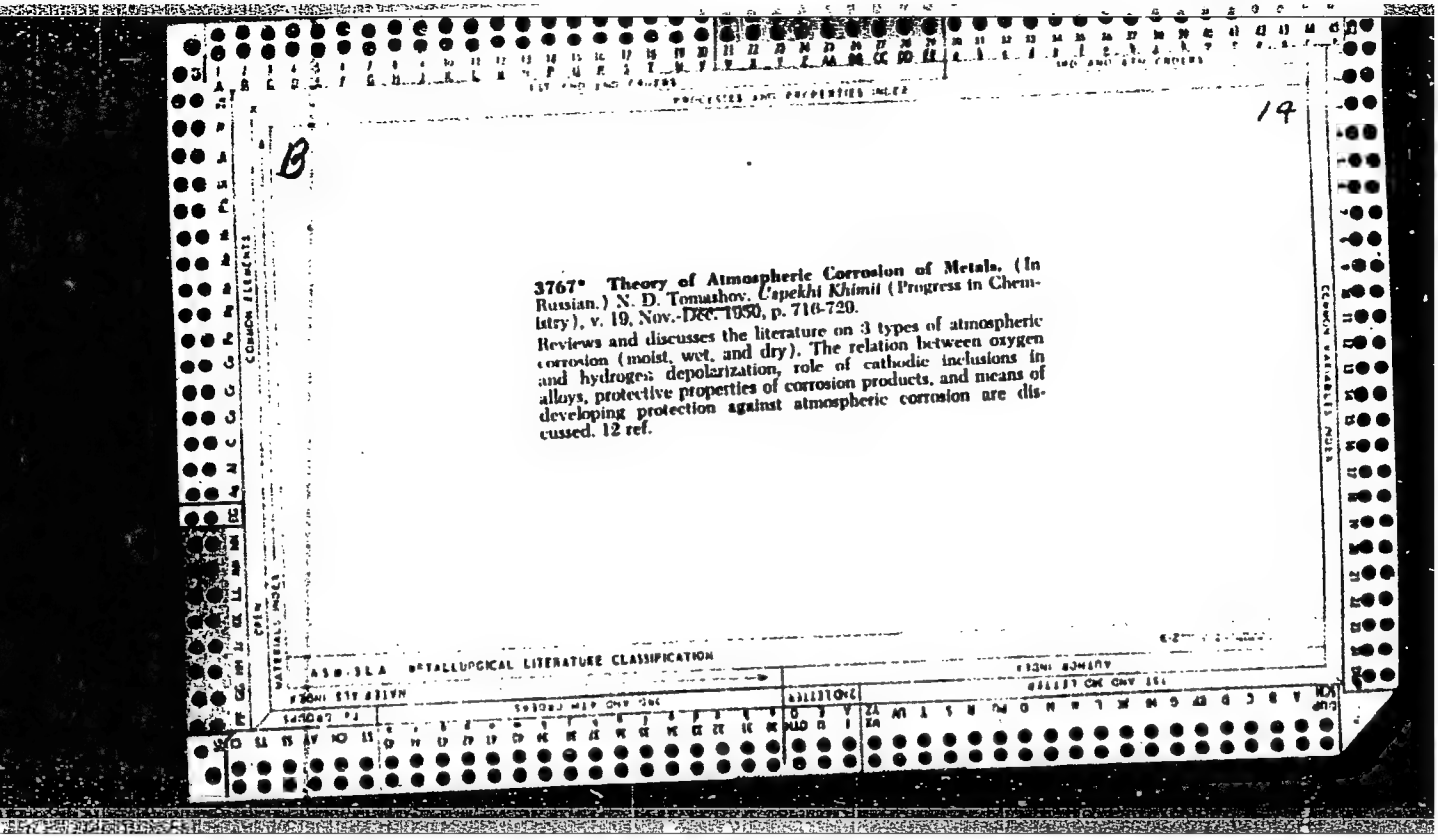
Method of Fixing and Insulating Specimens for Electrochemical and Corrosion Investigations. V. N. Modestova and S. D. Tomashov. (*Zavodskaya Laboratoriya*, 1950, No. 3, 365–366). [In Russian]. The use of polystyrene for sealing metal specimens into the solution-containing vessel during electrochemical and corrosion investigations is described.



CA

1

Fastening and insulation of samples for electrochemical and corrosion testing. V. N. Molestova and N. D. Tomashov (Acad. Sci. U.S.S.R., Moscow). *Zavodskaya Lab.* 16, 365-6(1950).—The use of polystyrene mountings is described. G. M. Kosolapoff



3767* **Theory of Atmospheric Corrosion of Metals.** (In Russian.) N. D. Tomashov. *Uspekhi Khimii* (Progress in Chemistry), v. 19, Nov.-Dec. 1950, p. 716-720.

Reviews and discusses the literature on 3 types of atmospheric corrosion (moist, wet, and dry). The relation between oxygen and hydrogen depolarization, role of cathodic inclusions in alloys, protective properties of corrosion products, and means of developing protection against atmospheric corrosion are discussed. 12 ref.

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Cathodic processes during metallic corrosion. N. D. Tomashov and T. V. Matveeva (Acad. Sci. U.S.S.R., Moscow). *Zhur. Fiz. Khim.* 24, 1281-93(1950).—The kinetics of H and O depolarization on metals and alloys is studied. The rates of H evolution (v_H) and O absorption (v_O) are measured volumetrically (*C.A.* 40, 1773[1]) e.g. during 100-150 hrs. Values of the ratio v_O/v_H for Al, Cu, Cd, Fe, Zn, and Mg (at 25°, 700 mm. in air, in a 0.5 *N* NaCl soln.) are, resp., ∞, ∞, 104, 137, 33, and 0. Various Al alloys are also studied in a 0.5 *N* NaCl soln.; with low concns. of foreign elements, the corrosion of the alloy changes with v_O; for alloys with higher concns., v_O does not change much from alloy to alloy and the corrosion is detd. by v_H. The kinetics on a duralumin cathode is also studied in a variety of conditions (temp., immersion, O atm., mixing of soln., addition of H_2O_2, periodic wetting of cathode): the different factors show that the increase in v_O is due to the neg. difference effect. In conditions simulating atm. corrosion of Mg, v_O may become equal to or even larger than v_H in contrast with the behavior of Mg in salt solns.

Michel Boudart

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Investigation of corrosion of aluminum under anodic polarization.
Trudy Inst.Fiz.Khim., Akad. Nauk S.S.S.R. 2, Issledovaniya po Korrozii Metal. No.1, 42-58 '51. (MLRA 4:10)
(CA 47 no.15:7347 '53)

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Anodic oxidation of aluminum in sulfuric acid. Trudy Inst.Fiz.Khim., Akad. Nauk S.S.S.R. 2, Issledovaniya po Korrozii Metal., No.1,110-25 '51. (CA 47 no.15:7346 '53)
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Electrochemical investigation of anodic films on aluminum. Trudy Inst.Fiz.Khim., Akad. Nauk S.S.S.R. 2, Issledovaniya po Korrozii Metal. No.1, 126-35 '51. (MLRA 4:10)
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Some relations in the growth of anodic oxide films on aluminum in sulfuric acid. Trudy Inst. Fiz.Khim., Akad. Nauk S.S.S.R. 2, Issledovaniya po Korrozii Metal., No.1, 136-45 '51. (MLRA 4:10)
(CA 47 no.15:7346 '53)

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Hydrogen and oxygen depolarization in corrosion of metals. Trudy Inst.Fiz.Khim.Akad. Nauk S.S.S.R., 2, Issledovaniua po Korrozii Metal. No.1, 146-65 '51.
(CA 47 no.14:6850 '53) (MLRA 4:10)

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Investigating the mechanism of corrosion in copper steels.
Trudy kom. po bor'. s korr.met. no.1:175-192 '51. (MLRA 10:8)
(Copper steel--Corrosion)

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Apparatus for the relative estimation of the elasticity of anodic films of aluminum. Trudy Inst.Fiz.Khim., Akad. Nauk S.S.S.R. 3, Issledovaniya Korrozii Metal. No.2, 13-16 '51. (MLRA 5:2)
(CA 47 no.17:8559 '53)

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Apparatus for obtaining polarization curves. Trudy Inst. Fiz.Khim., Akad. Nauk S.S.S.R. 3, Issledovaniya Korrozii Metal. No.2, 74-5 '51. (CA 47 no.16:7831 '53)

(MLRA 4:10)

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Method of fixing and insulating specimens for electrochemical and corrosion studies. V. N. Modestova, N. D. Tomashov., Trudy Inst. fiz. khim. AN SSR, No. 3, 1951.

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Device for determining the depth of corrosion damage. Trudy Inst. fiz. khim. AN SSSR, no. 3, 1951.

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Device for relative evluation of the elasticity of anodic coatings on aluminum. Trudy Inst. fiz.khim. AN SSSR, No. 3, 1951.

9. Monthly List of Russian Accessions, Library of Congress, May 1953, Uncl.

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Methods for measuring the porosity of anodic oxide coatings on aluminum and its alloys. Trudy Inst.fiz.khim. AN SSSR, NO. 3, 1951.

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[Corrosion and the protection of metals] Korroziia i zashchita metallov. Pod obshchei red. N.A.Izgarysheva. Moskva, Gos.nauchno-tekhn.izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1952. (MIRA 8:4)
(Corrosion and anticorrosives)

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USSR/Chemistry - Corrosion

Mar 52

"Ozone as a Cathodic Depolarizer in Processes of Metal Corrosion," N. D. Tomashov, A. Z. Valiulina, Inst of Phys Chem, Moscow, Acad Sci USSR

"Zhur Fiz Khim" Vol XXVI, No 3, pp 417-424

In a weakly alk soln (p_H=9.2) ozone is not reduced directly: decompg at the cathode, it produces supersatn with oxygen and increases the limiting diffusion current. In acidic electrolytes, at much more pos potentials than the potential of oxygen ionization, ozone is directly reduced under assimilation of 2 electrons. The limiting diffusion current is higher in an acidic

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than alk medium, because ozone is more stable in acidic soln. The authors' assumption that ozone is a corrosion accelerator because of its cathodic depolarizing effect has been confirmed experimentally. In the expts described, Cu, Fe, and Al were as cathodic materials. The problem of corrosion caused by ozone is of importance at high voltage installations.

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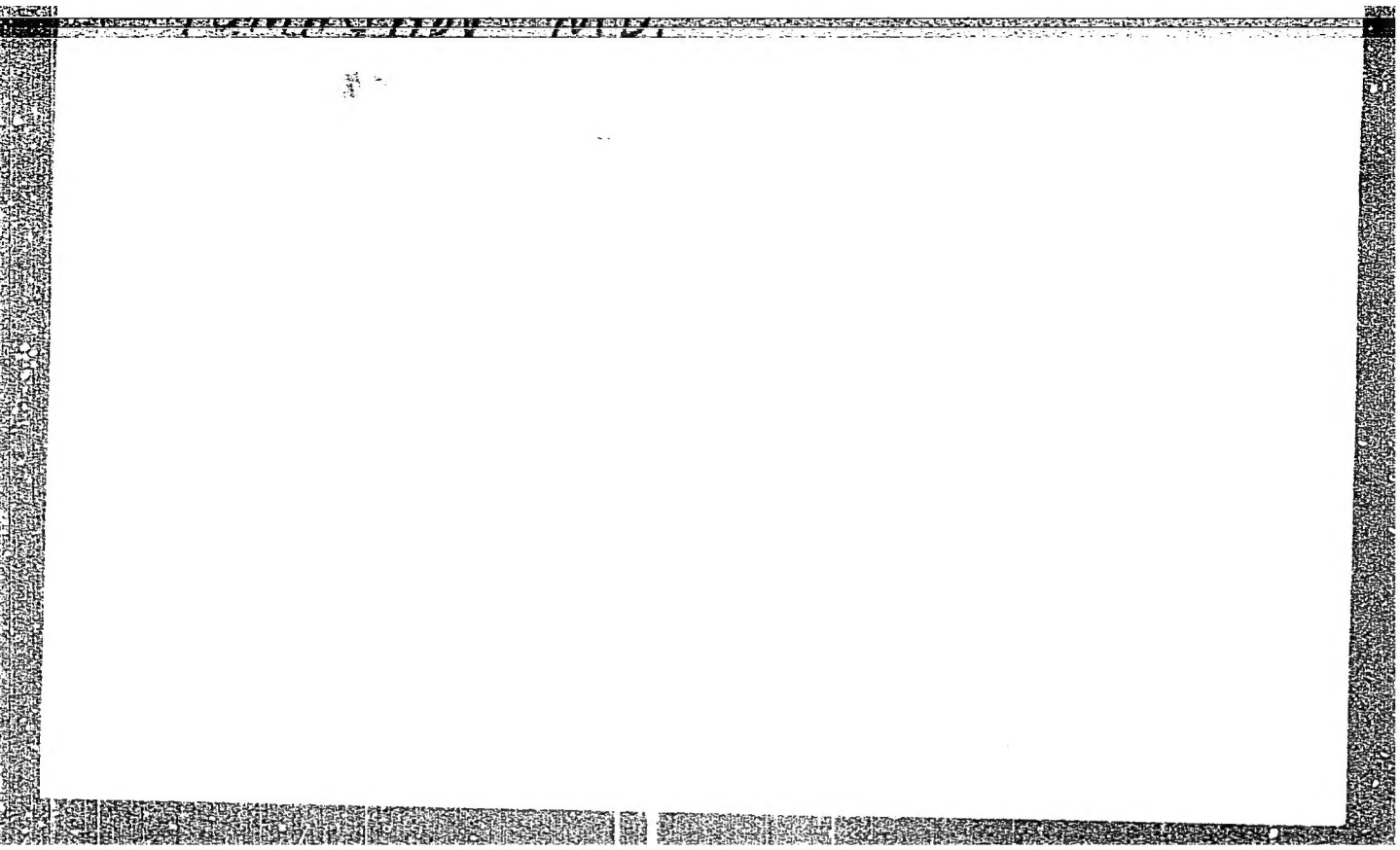

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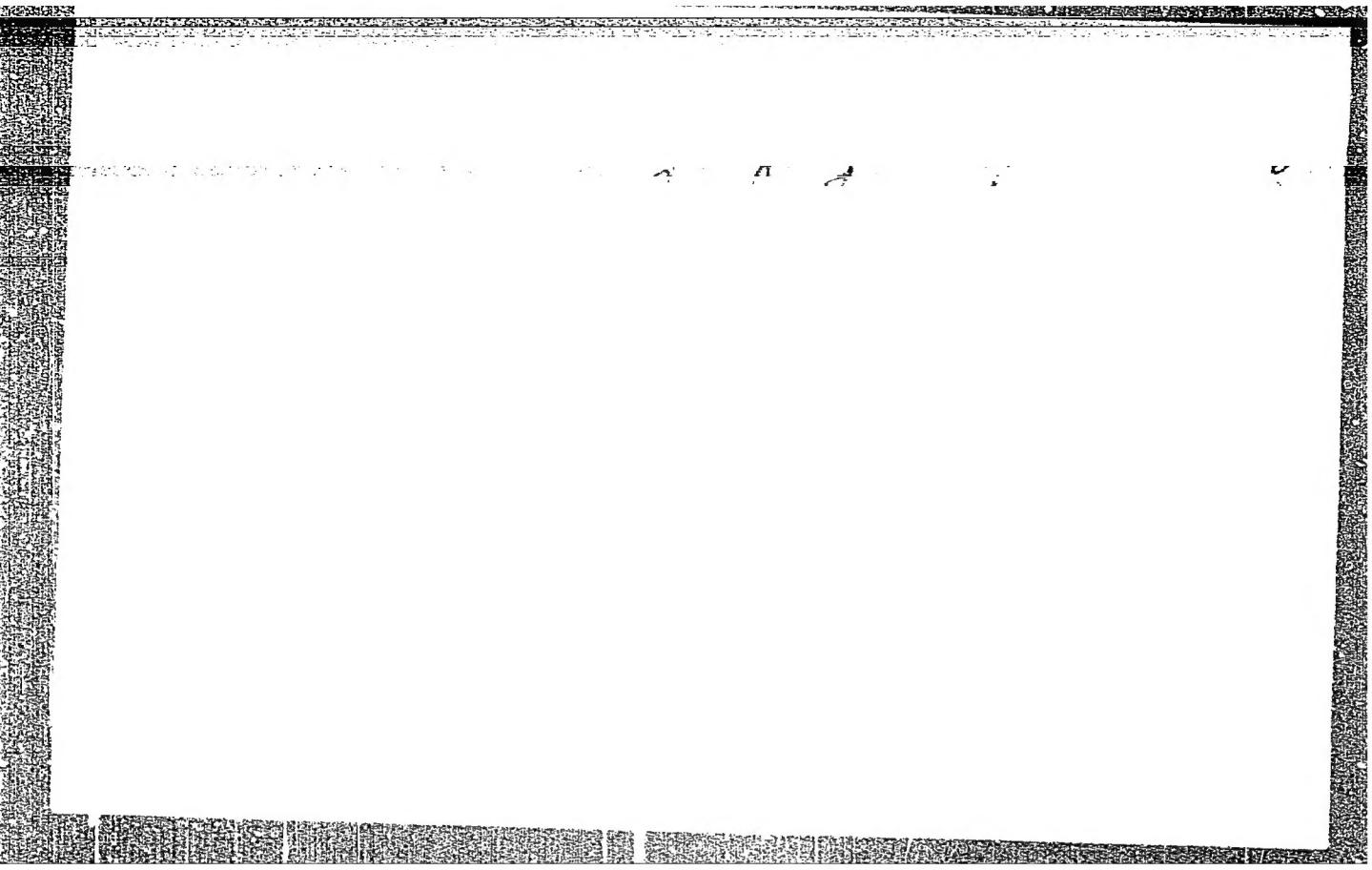

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